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Route of two Nepalese Embassies to Peking with remarks on the water-shed and plateau of Tibet.—By B. H. HODGSON, Esq.

The two following papers (it may be as well to state, in order to show their trustworthiness) were presented to me by the Maha Rájáh of Nepal in 1843, when I took my leave of him after having resided at his court for ten years in the capacity of British minister. His Highness was pleased to say he desired to give me something, which, not being of monied value, I should be permitted to retain, and which he knew I should set especial store by, and all the more because I was aware that the communicating of any such information to the “Feringé” (European) was contrary to the fixed policy of his government. And therewith His Highness gave me these two documents as well as several others of equal interest. The papers now in question comprise official summaries of the routes of two of those embassies of tribute and depeudance, which, since the war of '92 with Tibet (aided by China), Nepal has been bound by treaty to send to Peking once every five years. It is customary for these embassies always to keep nearly or quite to the same track, they being conducted through Tibet and China at the expense of the celestial empire and under the guidance of officers appointed by it.

The time of departure from Kathmandu is determined by the opening of the passes over the Himalaya, which takes place usually during the first half of June by the melting of the snows; and that accordingly is the regular period for the setting out of the

ambassador, who usually reaches Peking about the middle of the following January. The ambassador's suit is rigidly fixed as to number and as to every other detail; and, well or ill, tired or not, his excellency is obliged by his pragmatistical Chinese conductor (perhaps we should add in candour, by the character also of the country to be traversed) to push on towards his destination with only one halt of about a month and half at Lhása, where, luckily for him, there is always some necessary business to transact, the Nepalese having long had commercial establishments in that city. The ambassador, who is always a man of high rank (Hindu of course) and rather advanced in life, can take his own time, and cook and eat his own food, and use his own comfortable sedan chair or more comfortable litter (*dáudi*, hammock) as far as Tingri. But there the inexorable Chinese *Mehmandár* (honorary conductor) meets him with the assigned set of ponies for himself and suit, and his excellency must now mount and unceasingly as inflexibly pursue his journey through a country lamentably deficient in food, fuel, and water, by pretty long stages and without a halt save that above named, on horse-back, over a very rough country, for some one thousand seven hundred miles, and then only exchange his pony for the still worse conveyance of a Chinese carriage (more properly, cart) which is to convey him with like persistency some seven hundred miles further, fatigue and bad weather notwithstanding, and the high caste Hindu's cuisine (*horresco referens*) all the while entirely in the hands of filthy *Bhótias* and as filthy Chinese! Of course there is a grand lustration after each embassy's return home, which usually happens about two years from the time of its departure for Peking; and many a sad and moving story (but all reserved for friends) the several members of these embassies then have to tell of poisonous compounds of so-called tea* and rancid lard or suet, given them for drink in lieu of their accustomed pure lymph or milk; of heaps of sun-dried flesh incessantly substituted for the farinaceous and vegetable food of all decent Pagans; nay, of puppies served up to them for kids, and cats for hares, by stolid beastly cooks of *Bhôt* (Tibet) under the orders of a seemingly iusociant and

* The so-called brick tea which is composed of the sweepings of the tea manufactory cemented by some coarse kind of gluten.

really pragmatical Chinaman, who answers all objections with ‘Orders of the emperor,’ ‘Food of the country,’ ‘You nicer than us, forsooth,’ ‘Fed or unfed you start at such an hour.’ It is singular to observe the celestial empire treating Asiatics with like impertinence as Europeans, and it is satisfactory to think that the recent treaty of Nepal with Tibet, has put an end to these and other impertinences.

I proceed now to a few remarks on the form and substance of the papers. The form is such as might be expected from men, of a nation of soldiers and statesmen, scant of words and having an eye to business in the survey of a country. Blucher regarded London merely as a huge store-house of valuables, fit, and haply destined, to make spoil for a conquering army. And a Nepalese regards Tibet and China, not from a picturesque or scientific point of view, but with reference to the obstacles their natural features oppose to a daring invader having an eye to business in Blucher’s line. The chief item therefore of both itineraries and the only one of the shorter, is an enumeration of the mountain ridges or ranges intersecting the way (a most valuable piece of information, as we shall soon see); and to this the longer paper adds a similar enumeration of the intervening rivers, with the means of passing them, or the ferries and bridges; the forts occurring all along the route, and, lastly, the lakes and tanks where drinking-water can be had—a commodity most scarce in those regions where half the lakes are brackish. These several items, together with the stages, and the distances (computed by marching-time as well as by reference to the Nepalese kos of $2\frac{1}{3}$ miles each) comprise the whole information conveyed. But it will nevertheless be allowed that so authentic an enumeration of so many important particulars relating to so vast an extent of country so little known, is of no small value; and, though here packed into the smallest compass, that information might in the hands of a skilful book-maker suffice to furnish forth a goodly volume. But book-making is in no repute with the gentry of Nepal. It belongs solely to pandits, whilst on the class of official scribes is devolved the task of recording all useful information, which they are strictly required to embody in the fewest possible words and smallest space. I will only add on this head of the form of the papers.

1st. That the records of the two embassies having been made

at the several times of those missions, and quite independently of each other, the statements of one may be used to correct and explain those of the other; and that, where discrepancies occur, the longer paper, which is complete in its details, is probably, on the whole, more correct than the one which is not complete in its details, though I confess a strong leaning to the Chountra statement, because of its sound discrimination of interesting facts.

2nd. That the assigned distances, though not measured, but computed, yet, having a double basis of computation* by marching time under given assigned circumstances, and by kos according also to a given standard in use in Nepal, ought, I should think, to be capable of very definite determination in competent hands.

3rd. That both papers are literal translations, and that the additional information procured by myself and embodied for convenience in the documents, is carefully distinguished by the use of brackets; the rest of such information being thrown into foot notes.

The Chountra's embassy, as I learnt before I left Kathmandu, set out in 1817. That of the Kaji, in 1822, as appears on the face of the document. Chouutra and Kaji are titles of ministers of state in Nepal. I proceed now to the substance of the documents, and here, in imitation of my friends, I shall be as curt as possible, and endeavour, in a few words, to bring together the most generally interesting items of information furnished by the two papers. The total distance from Kathmandu to Peking, according to the Kájí, is $1268\frac{1}{2}$ kos; according to the Chouutra, 1250 kos; and in that space, occur, according to the former authority, 106 mountain ranges which are crossed; according to the latter, 104. The Kájí's paper gives us the further information, that 150 lakes and tanks occur in the route; 652 rivers,† crossed by 607 bridges and 23 ferries; and lastly, 100 forts.

It would be very desirable in dividing the whole space into the

* I have heard, that the whole road is measured and marked by the Chinese, and if so, the Nepalese could never be much out, the only thing required of them being the conversion of li into kos.

† Say rather, rivers and river-crossings, for the same mountain locked stream is here and there crossed 20 or 30 times in a very moderate distance. When I pointed out this at Kathmandu I got the explanation, and was referred to the crossings of the Rápúti river between Hitounda and Bhimphédy on the road to Kathmandu from the plains of India for a sample.

political and natural limits of the several countries traversed, to make the Chountra's and Kájí's papers coincide. But I have attempted this in vain, owing to the different names cited in the two papers and the different methods of citation. In regard to political limits they concur sufficiently, but not in regard to natural limits. I therefore give the former according to both papers; the latter according to the Chountra's only, it being quite clear on that head. I annex the langúrs or mountain ranges to both statements.

Political limits Mountain ranges
according to Chountra, Kájí Chountra, Kájí.
kos.

I. Nepal (from Kathmandu to Khása),	29	34½	6	5
II. Tibet (from Khása to iron bridge of Tachindo),	636	649½	63	71
III. China (Tachindo iron bridge to Peking),	585	584½	35	30
	<hr/>	<hr/>	<hr/>	<hr/>
	1250	1268½	104	106

Remarks.

I.—From Kathmandu to Khása there is a difference of 5½ kos, obviously caused by the Kájí's detour viâ Sánkhú, instead of keeping the direct road as the Chountra did.

II.—From Khása to the iron bridge of Tachindo the difference is 13½ kos. It is pretty clearly caused, partly by a small detour, as before, and partly by a slightly different use of terms. In the Chountra's paper the specification in the body of the document is "on this side of Tachindo;" in the remarks appended to it, "beyond Tachindo," whereas the Kájí's paper specifies Tachindo itself.

III.—From the iron bridge of Tachindo to Peking the difference is only half a kos, which is not worth mentioning.

Natural limits from the Chountra's paper.

	<i>Kos.</i>	<i>Mountain ridges.</i>
1. Cis-himalayan region (Kathmandu to Bhairav langúr),	50	7
2. Trans-himálayan region (Bhairav langúr to 4 kos beyond Chinchí Shan, where the <i>great</i> mountains cease),	635	65
3. Chinchí Shán to Pouchin (where <i>all</i> mountains cease),	212	30
4. Plains of China (Pouchin to Peking),	353	2
	<hr/>	<hr/>
	1250	104

To these distributions I subjoin, though it be a repetition, the excellent concluding remarks of the Chountra's paper :

"Thus there are 104 langúrs (or mountain passes) between Kathmandu and Peking, and of these 102 occur in the non-carriageable part of the way, or the first 897 kos ; and the last 2 langúrs only, in the remaining 353 kos, or the carriageable part. The last named part of the way may be said to be wholly through plains, for, of the two hills occurring, only one is at all noticeable, and both are traversed in carriages. From Kathmandu to the boundary bridge beyond Tachiudo (China frontier) is 665 kos, and thence to Cinchi Shán is 20 kos. Throughout these 685 kos from Kathmandu mountains covered (perpetually ?) with snow occur. In the remaining 565 kos, no snowy mountains occur."

In the way of provincial boundaries we have the following. From Gnáksá, the 37th stage of the Káji's paper, to Súngwá, the 51st stage of the same paper, is the province of U, which contains the metropolis of Tibet or Lhása. At Súngwá, or, in full, Kwónbo grámda Sáugwá, commences the Tibetan province of Khám, which extends to Tachindo or Tazhi-deu which is the common frontier of China and Tibet. It occurs at the 104th stage of the Káji's paper. The native name of Tibet is Pót vel Bód. The Sanskrit name is Bhót. This is Tibet proper or the country between the Himalaya and the Nyeuchhen-thánglá, which latter name means (and the meaning is worth quoting for its significance) pass of (to and from) the plains of the great Nyen or Ovis Ammon, or rather, great Ammon pass of the plains. That portion of Tibet which lies north of the Nyenchhen-thánglá (as far as the Kwanleun) is denominated by the Tibetans—the western half, Hóryeul, and the eastern half, Sókyeul, after the Hór and Sók tribes respectively. The great lake Namtso demarks Northern Tibet in the same way that the great lake Yamdotso denotes Southern.

A word more about the Bhairav langúr which is equivalent to Mount Everest as recently explained to the Society. The Chountra's paper makes it 50 kos from Kathmandu ; the Káji's, $52\frac{1}{2}$ kos. But to obtain the latter result, you must not blindly follow the entry in the itinerary but remember that this "huge snow mass"*

* This great mass is visible alike from the confines of Nepal proper (the valley) and from those of Sikim and all the more unmistakeably because it has no compe-

covers a large space of the road which must be understood as *commencing* soon after leaving the 14th stage or Thólung and not after leaving the 15th stage or Tíngri Langkót.

The documents now submitted themselves suffice to prove the meaning of langúr, since they show it to be equivalent to the lá of Tibetan and the Shán of Chinese; consequently also (as we know from other sources) to the Turkic tágh and the Mongolic úlá. It may therefore be rendered "mountain" as well as "mountain pass," and this is the reason, perhaps, why the Nepalese often do not discriminate between the name of the pass and of the peak of Bhaírava but blend them both under the name Bhairav langúr, which is equivalent to the Gnálhám thánglá of the Tibetans. Col. Waugh therefore may be assured that his Mount Everest is far from lacking native names, and, I will add that I would venture in *any* case of a signal natural object occurring in Nepal to furnish the Colonel with its true native name (nay, several, for the country is very polyglottic) upon his furnishing me with the distance and bearings of that object, although neither I nor any European had gone near it.* For the rest, I cannot withhold my congratulations upon this second splendid result of Col. W.'s labours though alack! it would seem fatal to my pet theory of sub-himalayan water-sheds,—a term carefully to be discriminated from *the Himalayan* water-shed to which I now purpose briefly to advert.

Since I presented to the Society in 1849 my paper on the physical geography of the Himalaya a good deal of new information has been published, mixed with the inevitable quantum of speculation, touching the true character of that chain, and the true position of its water-shed, with their inseparable concomitants, the general elevation and surface character of the plateau of Tibet.

It is a titor for notice in the whole intervening space. It is precisely half way between Gosain-than which overlooks Nepal proper and Kangchan which overlooks Sikim.

* It is obvious to remark, that no European has ever approached Dhavalagiri which yet lacks not a native name known to Europeans and in fact I myself have been twice as near to Déva dhúnga, vel Bhairav thán, vel Bhairav langúr, vel Gnálhám thánglá, as any European ever was to Dhavalagiri. The Bhotias often call the Bhairav langúr, Thánglá or "pass of the plain," viz. of Tíngri, omitting the more specific designation Gnálhám, which also might alone designate the object, nay, which is *the* name of the snowy mass as opposed to the pass over it and the plain beyond it.

After an attentive perusal of these interesting speculations I must, however, confess that I retain my priorly expressed opinion that the great points in question are inextricably involved with, and consequently can never be settled independently of, the larger question of the true physical features of the whole of the *bám-i-dúnya* of Asiatics and *Asie Centrale* of Humboldt. It *may be* that the Himalaya is not a chain at all, but an exemplification of the truth of Elie de Beaumont's theory that so-called mountain chains are only parallel dispositions of a series of geological *nœuds* which, if laid side by side, constitute the semblance of a chain of longitude, and, if laid one over the other, constitute the semblance of a chain of latitude or a meridional range.

It *may be* that the Himalaya is not a longitudinal but a meridional chain, and that the geological back-bone of the whole continent of Asia does not run parallel to the greatest development of that continent or east and west, but transversely to that development or north and south, and that the *Khin gan úla* is an indication of the northern extremity of this back-bone; the *Gángri* or water-shed of the Indus and *Bráhma-putra*, an indication of its southern extremity.

It *may be* that the question of the water-shed is not to be regarded with reference to the adjacent countries only, but, as Guyot and others affirm, with reference to the whole eastern half of the continent of Asia; and that the southern part of Tibet, inclusive of the Himalaya, is to be regarded as shedding the waters of Eastern Asia from the Arctic to the Indian Ocean. Such things, or some one of them, I repeat, *may be*, and one of the theories just enumerated *may* involve the true solution of questions for some time past investigated and debated on the frontier of India, though without any sufficiently distinct reference to those theories, prior though they all be in date. But the mere statement of them suffices, I should say, to show that they will not find their solution on that frontier, but only when the whole *bám-i-dúnya* (dome of the world, a fine orientalism) has become accessible to science.

In the meanwhile, without seeking to deny that many facts*

* Per contra, the numerous determinations of the height of the *gháts* at far distant points seem to warrant our assuming 17000 feet for the mean elevation of

seem to indicate that the axial line of the Himalaya lies beyond the ghát line, it is obvious to remark that this assumed line is still parallel to the ghát line, though beyond it, and consequently *cannot be reconciled* with an essentially meridional axis, such as the Gángri range presents. And, upon the whole, and with reference to organic phænomena especially, the ghát line still presents itself to me as the best divisor of the Indian and trans-Indian regions and climates, though I am not unaware that bráhmanic geography has, from remote times, carried the Indian frontier up to Mansaróvar and Rávanhrád, to the Brahmápútra and Indus line in Tibet. And, again, though I do not, nor ever did, doubt that Tibet is a very mountainous country, yet I conceive that there are good reasons for admitting the propriety of Humboldt's general designation for it. He calls it a plateau or elevated plain, and all those I have conversed with who have passed from various parts of the Himalayan countries into those of Tibet have expressed themselves in terms implying a strong distinction at least between the physiognomy of the former and the latter regions. I would add, that nothing can be juster or finer than Turner's original contrast of the two.

No one acquainted, as I have long been, with the native descriptions of Tibet,* or with the general and special delineations of the country by Danville, based entirely upon native materials, or with such enumerations of mountain ranges occurring between the Nepalese and Chinese frontiers, as the accompanying documents contain, could for a moment question that mountains abound in Tibet. On the other hand, there are several reasons of a general nature, besides the specific allegations of the fact by the people, to prove that wide spread plains also abound there. It may be worth while to enumerate these reasons. They are as follows:

1st.—One language only prevails throughout all the provinces of Southern Tibet, that is to say, throughout Balti, Ladák, Nári,

the ghát line; and it may well be questioned if any line of equal height and extent exist north of that line. It is the closing of the *gháts* that annually stops all access to Tibet, not any obstacle beyond them.

* Journal No. IV. for April, 1832, Article I.

Utsáng and Khám,* or, in other words, from the Bolór nearly to the Yúnling, whilst in the same extent of country in the Himalaya very many languages are found.

2nd.—The language of Tibet has express and familiar terms for plain and valley which are respectively called tháng and lúng in Tibetan, whereas the Himalayan tongues have no word at all for a plain, no distinct one for a valley.†

3rd.—It is well known, that there are very many lakes in Tibet and several of them of great size—a fact which involves the existence of large level tracts also, as the contrary fact in the Himalaya involves (what is notorious) the absence of wide spread levels.

4th.—Tibet is the permanent habitat of wild animals of the true ox, deer, and antelope types—all creatures of the plain and not of the mountain, and none therefore found in the Himalaya.

5th.—Tibet is annually the seasonal resort of vast numbers of the wading and swimming tribes of birds which pass from the plains of India to those of Tibet every spring, and stay in the latter till the setting in of winter, whilst the whole of these birds entirely avoid the Himalaya. “The storks know their appointed seasons in the heavens,” and their skilfully disposed phalanxes periodically afford one of the finest sights we have.

There are few of the Tibetan plains more noticeable than that which occurs immediately on passing the Himalaya by the Bhairav langúr—few contrasts more palpable than that of the cis and trans-himalayan regions at this well known and central point; and when I lately requested Major Ramsay, the Resident in Nepal, to get for me a confirmation or refutation of my opinion, he answered “Dr. Hooker must be in error, when he says there are no extensive plains in Tibet, because Tingri maidan (plain) for example, is fully 60 miles in length and 15 to 20 in breadth. Til bikram Thássa assures me that, in the recent war, he marched along that plain for several days and passed a lake three days in circumference and

* Journal No. IV. for April, 1832, Article I.

† The numerous names of places in Tibet which are compounded with the word Tháng, a plain, as Chantháng in Nári, would alone suffice to prove that the general surface of Tibet is very different from that of the Himalaya.

which he estimated to be as large as the valley of Nepal.* When asked if Tingri maidan was any thing like the valley of Nepal, he said, 'No! Horsemen could not gallop about Nepal. They would have to keep to the roads and pathways. But numerous regiments of cavalry could gallop at large over the plain of Tingri.'" In a like spirit the Tibetans themselves compare the vast province of Khám to a "field," and that of U'tsáng to "four channels"†—both expressions plainly implying abundance of flat land and the latter also indicating those ranges parallel to, and north of the Himalaya which all native authorities attest the existence of in Tibet, not only in Nári but also in U'tsang and Khám. The most remarkable of these parallel chains, and that which divides settled from nomadic, and north from south, Tibet, is the Nyénchhén thán-glá, of which I spoke in my paper on the Hórsók‡ and of which I am now enabled pretty confidently to assert that the Karakorum is merely the western prolongation, but tending gradually towards the Kwanleum to the westward. But these parallel ranges imply extensive level tracts between them, which is the meaning of the "four channels" of U'tsáng, whilst the east and west direction of these ranges sustain Humboldt's conception of the direction of all the greater chains of Asie Centrale, or the Himalaya, Kwánleúm, Thían and Altaí, as also of that of the back-bone of the whole Asiatic continent which he supposes to be a continuation westward of the second of these four chains.

Upon the whole, I conceive, there can be no doubt that Tibet proper, that is, Tibet south of the Nyénchhén thán-glá range, is, as compared with the Himalaya, a level country. It may be very well defined by saying it comprises the basins of the Indus (cum Satluj) and Brahmaputra.

In this limited sense of Tibet—which the native geographers divide into Western, Central, and Eastern Tibet, called by themselves Nári, U'tsáng, and Khám, or, when they would be more precise, Balti, Máryúl, vel Ladák, Nári, Tsáng, U', and Khám—Gángri is the water-shed of Tibet.

* The valley of Nepal is about 16 miles in diameter or 50 in circuit.

† Journal at *supra* cit.

‡ Journal No. II. of 1853.

The region of the lakes, Mapham and Lanag, equal to the Man-saróvar and Rávanhrád of Sanskrit geography, is situated around Gángri, where the elevation of the plateau is 15,250 feet. From this region the fall of the plateau to the points where the rivers (Indus and Brahmaputra, or Singkhá-báb and Erú) quit the plateau, is great, as we sufficiently know from the productions of Balti and of Khám at and around those points. In lower Balti snow never falls: there are two crops of grain each year, and many excellent fruits, as we learn from native writers;* whilst my own information received vivâ voce from natives of those parts, assures me that the country towards the gorge of the Erú or Brahmaputra is, like Balti, free of snow and yields two crops a year; that rice is produced and silk and cotton; and that these last articles form the ordinary materials of the people's dress. These points cannot therefore exceed 4—5000 feet in elevation, which gives a fall of above 10,000 feet from the water-shed, both ways.

I will conclude these hurried remarks suggested by the ambassadorial routes from Kathmandu to Peking, now submitted to the Society, with a statement, which I think the Society will perceive the high interest of, with reference to those recent ethnological researches, the whole tendency of which is more and more completely to identify the Turánians of India and Indo-China with those of the trans-himalayan countries.

It is this, Erú-tsángpo is the name of *the* river of Tibet: Erú-wádi, that of *the* river of Western Indo-China or Ava: Erú vel Arú, that of *a* river in the Tamil and Telugu languages. Now, when we remember that Tsángpo is a mere local appendage, to the Tibetan word,† and wádi vel wáti, a mere prakritic appendage to the Burmese word; and further, that the Turánians of Tibet, the Himalaya, and Indo-China, are still constantly wont to denominate their chief river by the general term for river in their respective

* Journal for April, 1832.

† Tsángpo, of or belonging to Tsáng, the province of which Digarcha is the capital and by which place the river (Erú) flows. Even the prefixing of a Y, (Yéru-Yáru) is equally Tibetan (in speech) and Dhavirian! Turner's is the first and correctest writing of the word, Erú-chámbu to wit, for chámbu is the soft spoken sound of Tsángpo.

languages (teste Meinám, Likhu, &c), we shall hardly be disposed to hesitate in admitting that the Northmen as they moved Southwards into the tropical swamps of India and Indo-China, clung to, and perpetuated, even amid various changes of language, that name of the river of their northern home (viz. *the* river, kat' héxokín) with which was associated in their minds the memory of their father-land.

“By the waters of Babylon they sat down and wept.”

P. S.—Before I went to England in 1853, I had been so fortunate as to gain access to some Gyárungs and Tákpas or inhabitants of Sífán and of the south-eastern confines of Tibet. In my paper on the Hórsók I gave the substance of their information about Sífán. I will here add a few scattered particulars about the country lying above Asám, and the rather, because from the date of my return to India up to this hour, I have never again been able to get access to these people. The Tibetans and Sífánese are wholly unacquainted with the terms Daphla, Abor, Bor, Aka, Miri, Mishmi, Khamti, by which we denominate the tribes lying east of Bhútán. They recognise Cháng vel Sáng (Changlo of Robinson) as the name of a Bhútánese tribe or rather profession. They say that above Pal yeul or Nepal (easternmost part—alone known to my informants) is Tingri: above Deunjong or Sikim is Trinsam (the Dingham of Hooker and Damsen of myself): above Lhó or Bhútán is Nyéro: above Towáng is Chóna or Jháng chóna: above Lhokhapta is Khwómbo: above Chárung is Chozogon. These are said to be the respective Cis and Trans-himalayau districts occurring from the position of Kúti in Nepal eastwards to beyond that of Saddia in Asám. It is added that the river Erú vel Yérú (Brahmaputra) passes, from Kwómbo into Lhokhapta, beneath the great snowy mountain called Kwómbocháři, and that a great mela or mart is held there every twelve years. Lhokhápta, or Lhó of the cut lips, is so called to distinguish it from Lhó proper, because the people have the habit of making a permanent cleft in their lip.

Tsáng province is said to be bounded on the south by the Ghúngra ridge; on the west by Mount Ghúndalá; on the north and east by the Kámbala range; the province of U to be bounded east by Súngwa gyámda, west by the river Tamchokhamba, south by the

Kámbalá range, and north by the Nyénchhén thánglá. Beyond the last named great snowy range is situated the immense lake of Nám tsó which is said to bear the same relation to Northern Tibet that the Yámdo tsó (Paltè or Yárbrokyú) lake does to Southern. The former is the Terkiri and Téngri núr* of our maps, as to which maps we have the following further identifications. Ghámda = Gyámda. Batang = Pátháng. Rywadzé = Réwúché. Lári = Lhá-ríngo. Kiáng, added to great rivers, = Gyárung. River Takin = Gyámo gnúlchu, and river Yang-tse = Nyá chú. Pampou of Hue = Phémba: river and valley both so called. Galdeso river = Gal-den, and is the east boundary of Phémba and Lhása vallies as the Tolong river is their western boundary.

Abstract of Diary of Route from Kathmandu to Peking, as taken during the Embassy of Chountra Púshker Sáh, showing the number and position of the mountains passed.

Position of the mountain passes with the names of some of them.	No. of passes (called <i>lan-gurs</i> .)	Distance in kos.
From Kathmandu to Dévapúr,	One	Six.
Dévapúr to Bhót Sípa,	One	Four.
Bhót Sípa to Choútára,	One	Three.
Choutára to Bísambhara,	One	Six.
Bísambhara to Lísti,	One	Three.
Lísti to Khása,†	One	Seven.
Beyond Kúti, called Bháirava Langúr,‡	One	Twenty-one.
Beyond Shikar jeung, called Tánya chólá,	One	Thirty-four.
Within the Digarché limits,	One	Thirty-seven.
Beyond Digarché limits,	One	Ten.
On this side of Lake Khádu painti,	One	Thirty-nine.
Beyond Kapila painti,	One	Thirteen.
Beyond Lhássa circuit,	One	Sixty-six.
Beyond Chbánju gyánda of Kham,	One	Twenty-nine.

* Núr is Turkic for lake as tsó is Tibetan. Téngri núr, or celestial lake of the former tongue, is an exact translation of Nám tsó of the latter. The general prevalence of Turkic words in the geography of Northern Tibet more especially sufficiently evinces the presence of that wide spread tribe in Tibet.

† Boundary of Nepal and Tibet.

‡ Mount Everest of Waugh. § Tánya chólá = Thólá of the Kaji's paper ?

Position of the mountain passes with the names of some of them.	No. of passes (called <i>lan- gurs.</i>)	Distance in kos.
Beyond Achar jeung,	One	Eleven.
At Chhésu Kham,	One	Seven.
At Nangye-kúng,	One	Thirty-six.
At Tángtasáng,	One	Six.
At Láché,	One	Twelve.
At a nameless spot,	One	Three.
At a nameless spot,	One	One.
At a nameless spot,	One	Four.
At a nameless spot,	One	Four.
On this side of Lhóju,	One	Sixteen.
At Sáyan-á mócha,	One	Eight.
At a nameless spot,	One	One.
At a nameless spot,	One	Two.
At a nameless spot,	One	Three.
At a nameless spot,	One	Four.
At a nameless spot,	One	Two.
At a nameless spot,	One	Two.
At a nameless spot,	One	Two.
At a nameless spot,	One	One.
On this side of Chhámdo,	One	Fifteen.
At Páng-do,	One	Twenty-two.
At Hyá phélá,	One	Five.
At Thúmélá,	One	Three.
At a nameless spot,	One	Nine.
At a nameless spot,	One	Nine.
At a nameless spot,	One	Fourteen.
At a nameless spot,	One	Three.
At Névá,	One	Seven.
Beyond Lángurikhúde,	One	Four.
At a nameless spot,	One	One.
At a nameless spot,	One	Two.
At Kólósáng,	One	Twelve.
At Phúla,	One	Ten.
At Gólá,	One	Four.
At Phúnza dé,	One	Nine.

Position of the mountain passes with the names of some of them.	No. of passes (called <i>lan- gurs</i> .)	Distance in kos.
At a nameless spot,	One	Two.
On this side of Pátháng,	One	Seven.
At Tásó,	One	Nine.
At Sám BÁthúm,	One	Eleven.
At a nameless spot,	One	Six.
At a nameless spot,	One	Two.
At a nameless spot,	One	Three.
At Lámáyá,	One	One.
At a nameless spot,	One	Two.
At a nameless spot,	One	Three.
At a nameless spot,	One	One.
Beyond Litháng,	One	Ten.
At a nameless spot,	One	One.
At a nameless spot,	One	Seven.
At a nameless spot,	One	Two.
At a nameless spot,	One	Two.
At a nameless spot,	One	Seven.
At a nameless spot,	One	Two.
At Góló,	One	Nineteen.
On this side of Táchindó* or Tazhideu or Tazedo,	One	Thirteen.
At the military post of Khwálechín, . . .	One	Twenty-eight.
On this side of Chhinchí Syán (Shán, or Syán, = mountain in Chinese,)	One	Fifteen.
At a nameless spot,	One	Four.
Thus far the mountain ridges passed are generally large. Henceforward they are small.		
At a nameless spot,	One	Three.
On this side of Yáto,	One	Fourteen.
On this side of Paitán,	One	Ten.
Beyond Thinda phú and Kháto,	One	Thirty-five.
On this side of Locháng syán,	One	Two.

* The iron bridge beyond Tachindo is the boundary of Tibet and China. See Diary of a journey from Kathmandu to Tachindo printed in our Researches.

Position of the mountain passes with the names of some of them.	No. of passes (called <i>tan-gürs</i>).	Distance in kos.
On this side of Mingtou,	One	Seven.
At a nameless spot,	One	Four.
At a nameless spot,	One	Three.
On this side of Chatóu,	One	Two.
On this side of Ulingnai,	One	Ten.
At a nameless spot,	One	Six
On this side of Chantou,	One	Three.
At a nameless spot,	One	Two.
At a nameless spot,	One	One.
On this side of Gamsú,	One	Three.
At a nameless spot,	One	Six.
On this side of Kwángsyán,	One	Three.
Beyond Kwángsyán,	One	Six.
On this side of Saichháng,	One	Four.
At Saichháng,	One	Two.
Beyond Saichháng,	One	Five.
At a nameless spot,	One	Three.
At a nameless spot,	One	Two.
On this side of Níchhángtóu,	One	Seven.
On this side of Tángákü,	One	Six.
Beyond Mínsyán,	One	Three.
Beyond Póuthín syán,	One	Sixteen.
Beyond Lúpa syán,	One	Nine.
On this side of Phúng syán,	One	Twelve.
On this side of Póuching syán,	One	Nineteen.

Not carriageable thus far. Hence forward carriages may be used.*

At Chhálung,

One Carat.

At Sínghá syán,

One Carat.

[Distance of both, as cited below,

.. 353

Langúrs, 104 1,250 kos.

* This remark, as well as the prior one in the body of the paper, belongs to the original. The bracketed entry of distance is mine, taken from the remarks below of the original.

Thus there are 104 langúrs or mountain ridges and passes between Kathmandu and Pekin, and of these 102 occur in the noncarriageable part of the way or in the first 897 kos; and the last two only in the remaining 353 kos or the carriageable part. This latter may be said to be entirely through plains, for of the two hills occurring only one is at all noticeable, and both are traversed in carriages. From Kathmandu to the iron boundary bridge beyond Tachindo (China frontier) is 665 kos; and thence to Chinchí Shán or Mount Chinchí is 20 kos. Throughout these limits, or 685 kos from Kathmandu, mountains covered with snow occur. In the remaining 565 no snowy mountains occur.

Horses are used for the first 894 [query 897] and carriages for the last 356 [query 353]. Total 1250 kos.

Systematic summary of the Route from Kathmandu to Peking as traversed by the Nepalese ambassador to China, Kiji Dalbhanjan Pande, A. D. 1822-23, and set down by his secretary at the close of each day's journey.

No. of stages.	Halting place.	Distance in kos.	Time in ghadis and pals.	Mountain ridges or ranges crossed.	Lakes and tanks.	Rivers or river-crossings.	Boat ferries.	Bridges.	Forts.
1	Gourighát	One	1-5	None	One	Two	None	Two	None
2	Sankhú	Three	9-0	None	None	Two	None	None	None
3	Devapur	Four	15-0	One	None	Three	None	Three	None
4	Sípa	Three and half	11-0	One	None	Two	None	None	None
5	Choutará	Four	10-0	One	None	One	None	One	None
6	Pairya	Four	13-0	One	None	Three	None	Three	None
7	Thama gáon	Five	17-0	None	None	None	None	None	None
8	Listi	Two and half	13-0	One	None	Two	None	Four	None
9	Tuguná	Two and half	10-0	None	None	One	None	One	None
10	Khasá*	Five	19-0	None	None	Five	None	Four	None
11	Chosyang	Five	21-0	None	None	Three	None	Seven	None
12	Kuti	Four	17-0	None	None	Three	None	Three	None
13	Flacholing	Five	15-0	None	None	Three	None	Three	None
14	Thó-lung	Four	12-0	None	None	Three	None	None	None
15	Tigri langkót	Ten	20-0	One	Bhairav langur	Two	None	None	None
16	Tigri or Tingri	Three	9-0	None	[or Thang lá†]	One	None	One	One
17	Mimo	Six	13-0	None	Two	One	None	None	None
18	Sikár jeung	Six	15-0	One (Khyumrila)	Two	Two	None	Two	One
19	Lólah	Three	8-0	One (Gyachila)	None	One	None	None	None
20	Chyáchopé or Gyá chopé	Four and half	11-0	One (Thóla)† [la]	None	One	None	None	None
21	Tháng bá	Nine	17-0	One (Dhángso thoun-)	Two	Two	None	Two	One
22	Lalit jeung	Five	11-0	None	None	Two	None	None	One

* Boundary of Nepal and Tibet since 1792.

† Bhairav langur is the name in the Khas language. Thánglá, in full Gná-lhám thánglá, in that of Tibet. These names of the mountain ridges crossing the route are not in the original, but obtained by me from other sources and therefore bracketed. This famous pass, the heights above which and constituting with the pass one immense snow mass, which mass is equivalent to the Mount Everest of Waugh, commences (see Choun-tra paper) 3 kos beyond Tholing, or 55 kos from Kathmandu, 50 by the Chountra's more direct route.

‡ Thóla = Chóla or Tasya chóla of Chountra's paper.

No. of stages.	Halting place.	Distance in kós, ghásis and pals.	Mountain ridges or ranges crossed.	Lakes and tanks.	Rivers or river-crossings.	Boat ferries.	Bridges.	Forts.
23	Chyá táng	Four and half	None	None	None	None	None	One
24	Phancholyang	Five	None	None	One	None	One	One
25	Tási quáng	Four	None	None	One	None	None	None
26	Giri	Five	One (Khyongla)	None	One	None	None	None
27	Káti gómha	Nine	None	None	One	None	One	None
28	Digareha* or Zhikatsé	Three	None	None	None	None	None	One
29	Pená	Eight and half	One (Jikla)	None	One	None	One	One
30	Táka chyá	Seven	None	None	None	None	None	One
31	Gyang chí or Gyang-tse	Five and half	None	One	One	None	One	One
32	Kú-nashi or Kub-zhi	Seven	None	None	One	None	Two	One
33	Thung toi or Ralong	Five and half	None	None	Four	None	Three	None
34	Níchang-u or Zaro	Five	One (Chapla)	None	Two	None	One	None
35	Nágaklín jeung or Nan-gache	Five (Yamdo lake on right)	None	One	Two	None	Two	One
36	Pai khú jeung or Peitú	Six [Yaru]	None	One	One	None	One	One
37	Guá ksá	Six (cross the	One (Kambala)	None	None	None	None	One
38	Chúsung jeung	Six	None	None	Two	One	One	One
39	Gue táng	Nine	None	None	Three	None	Two	One
40	Lhasa	Six	None	None	Three	None	Two	One
41	Tai-chhín	Six	None	One	One	One	One	One
42	Miton ghúngá	Thirteen	One	None	Three	None	Two	One
43	Ringché lang	Five and half	None	One	Three	None	Two	One
44	U'sú elang or Usir gyáng	Five	None	None	Four	None	Four	None
45	Toi ta	Five	None	None	Five	One	Five	None
46	Nú gári or Nú mári	Nine	One (Gyámda thólá)†	Two	One	None	Seven	None
47	Sú súng tá	Nine	None	None	Six	None	Five	None
48	Chyang táng	Six	None	None	Two	None	Two	None
49	Ling ta	Six	None	None	Five	None	Five	None
50	Syang-tá	Five and half	None	None	Three	None	Three	One

* Zhú-khá-chhén of Newari, Capital of province of Tsáng, = Zhú-kát-sé of Tibetan and Digarcha of Khas.

† Gyámdo-thola and the seven next named mountains are said to be vast masses of perpetual snow.

No. of stages.	Halting place.	Distance in kós.	Time in ghadis and pals.	Mountain ridges or ranges crossed.	Lakes and tanks.	Rivers or river-crossings.	Boat ferries.	Bridges.	Forts.
85	Kúsú	Eight	17—0	One	None	Two	None	Two	None
86	Mángali	Nine	18—0	Two	None	Two	None	None	None
87	Khanéi khá	Three	6—0	One	None	None	None	None	None
88	Túngpá lóng	Eight	15—0	None	None	Two	One	None	None
89	Pá thàng	Eight	16—0	One	None	Three	None	One	None
90	Pá pùng	Three and half	7—0	None	None	One	None	One	None
91	Tá só	Nine	18—30	One	Seven	Two	None	One	None
92	Tsáng-pá	Seven and half	14—30	One	One	Three	None	Three	None
93	Láma yá	Twelve	23—30	Four	None	Nine	None	Eight } * None }	None
94	Tháng thúng	Ten	17—30	Two	Two	Four	None	Four	None
95	Lí than	Five	9—0	None	None	Two	None	Two	None
96	Khongtakhá	Seven	11—0	One	None	One	None	One	None
97	Kúmó-li	Twelve	21—0	Three	None	Three	One	One	None
98	Makai tóng	Nine	17—0	Two	None	Three	None	One	None
99	Khó khou	Four	8—0	None	None	Three	One	Six	None
100	Wó lési	Nine and half	16—30	None	None	Four	None	Eight	None
101	Tángwá lí	Seven	15—0	Two	None	Two	None	One	None
102	Anyáng yá	Five	10—0	None	None	Three	None	Two	None
103	Chéchain-to	Nine	20—0	One	None	Four	None	Four	None
104	+Táchindó or Tází-do	Four	7—30	None	None	Two	None	Five	None
105	Thou-thiang-sung	Five and half	10—0	None	None	Three	None	Four	None
106	Luting chéung	Eight	15—30	None	None	Three	None	Two	None
107	Phí syáng	Ten	19—0	None	None	Three	None	Four	None
108	Ní thyang	Seven	17—0	One	None	Seven	None	Nine	None
109	Chhyá chhú-syáng	Eight	18—0	One	None	Two	None	Three	None
110	Pai-phou	Seven	17—0	One	None	Six	Six	Ten	None
111	Lách yáng syáng	Four and half	7—0	None	None	Three	None	Four	None

* Figure for eight perhaps a cypher.

+ Boundary of Tibet and China proper. See Diary of a Cashmerian journeying on the route thus far in our Researches. Kham extends from Sangwa or 51st stage to this point.

from Sangwa or 51st stage to this point.

112	Yá-tou	Ten	21-0	One	None	Five	One	Nine	One
113	Pai tána	Nine	22-0	One	One	Five	One	Eight	None
114	Chi-tou	Eight	18-0	None	None	Seven	One	Six	One
115	Syang chang-shen	Eight	17-30	None	None	Twelve	One	Eleven	None
116	Chhin-púl	Nine	28-0	None	None	Thirty-nine* (crossings)	Three	Sixteen	One
117	Sídhú syá	Five	10-0	None	One	Fourteen	None	Fourteen	None
118	Tayang	Ten	19-0	None	None	Forty-seven	None	Forty-seven	Two
119	Lyóchang-syang	Five	9-0	One	None	Nine	None	Nine	One
120	Myang tou	Seven	15-0	None	Two	Six	None	Six	One
121	Chathung syang	Twelve	17-0	Two	Two	Fourteen	One	Three	One
122	U-liang-i	Eight	16-0	One	None	Two	None	Two	None
123	Chyá tang	Nine	17-0	Two	None	Four	None	Four	One
124	Tású sú	Eleven	23-0	Two	One	Six	None	Seven	None
125	Kwá yá syang	Ten	21-0	One	One	Three	One	Two	Two
126	Syású-yan-i	Twelve	28-0	Two	None	One	None	Two	One
127	Khwang pá-i	Six	12-0	Two	None	Three	None	One	None
128	Nichi-tou	Five	10-0	Two	None	One	None	None	One
129	Tá gnái	Nine	16-30	One	None	Three	None	None	None
130	Mya syang	Nine	16-30	None	None	Three	None	One	None
131	Pau tyang	Eight	12-0	None	None	Four	None	One	None
132	Mátá wei	Ten	18-0	One	None	Three	None	Two	None
133	Tályó-pá	Nine	16-0	Three	None	Six	None	Seven	One
134	Láng syang	Nine	15-0	One	None	Seven	None	Seven	None
135	Phrasyang	Nine	16-0	One	None	Seven	None	Seven	One
136	Khwa nyou-phú	Eleven	20-0	None	None	Six	None	Four	None
137	Pau ching syang	Ten	18-0	Two	None	Nine	None	Thirteen	One
138	Phrang syang-phra	Nine	17-0	None	Two	Four	None	Three	One
139	Chhi syang syan	Six	10-0	None	One	Three	None	Three	One
140	U kum syang	Twelve	21-0	None	Four	Four	None	Three	Two
141	Syang phrèng-syang	Nine	15-0	None	Four	One	None	One	Two

* These and the next two noted are crossings of one mountain-lockt river, not separate rivers. The 14 of stage 121 is another instance of the same kind.

Halting place.	Distance in kós.	Time in gharis and pals.	Mountain ridges or ranges crossed.	Lakes and tanks.	Rivers or river crossings.	Boat ferries.	Bridges.	Forts.
142 Sing-bá-phú	Ten	19-0	None	Two	Two	None	Two	Two
143 Lét-náng-shán	Six	13-0	None	Two	Four	None	Four	One
144 Pá-lán-syan	Eight	19-0	None	Two	Four	None	Three	One
145 Khwáng myú	Twelve	25-0	None	Eleven	Fifteen	None	Fourteen	Three
146 Pháng thou ten	Ten	23-0	None	Two	Five	None	Two	Two
147 Lyang pyáng-syang	Ten	23-0	None	None	Two	None	Two	Four
148 Sa-tou	Six	11-0	None	One	Five	None	Two	Two
149 I-páng-syí	Seven	14-0	None	None	Three	None	Three	Three
150 Myá-thung-syang	Seven	13-0	One	None	Seven	None	Six	One
151 Syáng lyáng-syang	Nine	20-0	None	One	Fourteen	None	Twenty-two	One
152 Khó lyáng syang	Seven	13-0	None	None	Seven	None	Seven	One
153 Múng syáng	Nine	20-0	None	Three	Two	One	One	One
154 Phai-chhen phú	Six	13-0	None	One	Four	None	Four	One
155 Yé khwá-i	Seven	13-0	None	None	Six	None	Six	One
156 Khwó-khou-chang-syang	Ten	21-0	None	Two	Five	None	Four	Two
157 Wei-khai-phú	Twelve	18-0	None	Twenty-two	Four	None	Four	Two
158 Chhí syáng	Six	12-0	None	Four	Five	None	Four	Three
159 I'-ka-i	Six	12-0	None	Two	Six	None	Five	One
160 Tá-tai-phú	Seven	3-0	None	Two	Seven	None	Six	Two
161 Sa-tou	Seven	13-0	None	None	Three	None	Three	One
162 Kháng-táng-syang	Seven	13-0	None	None	Six	None	Six	One
163 Súng-tou-phú	Twelve	12-0	None	One	Seven	None	Seven	Two
164 Lóí chhí-syang	Six	11-0	None	None	Three	None	Three	One
165 Pai-syang-syang	Six	12-0	None	None	Two	None	Two	One
166 Twá-ton	Six	11-0	None	One	Four	None	Four	One
167 Lou thyang-syang	Four and half	7-30	None	Two	Three	None	Three	One
168 Dyang-dyang-phu	Six and half	13-0	None	One	Three	None	Three	One
169 Shi to syáng	Nine	18-0	None	Two	Three	None	Three	One
170 Chhípú syáng	Nine	20-0	None	Two	Two	None	Two	One
171 Phá khú syáng	Seven	16-0	None	Two	Two	None	Two	One

172	Pou tván phú	One	11-0	None	One	Three	None	Three	One
173	Pai-khwó	Eleven	20-0	None	Six	Eight	None	Eight	None
174	Tá-tou	Eight	16-0	None	Seven	Six	None	Six	One
175	Lóng syán	Eight and half	18-0	None	None	Five	None	Five	Two
176	Pai-chin or (Pekin)	Seven	16-0	None	None	Five	None	Six	Three
176	176	1,267 (1,268½)	2,576	102 (106)	150	652	23	607	100

(True translation from Khas,)

(Signed) B. H. HODGSON.

REMARKS.—The above paper like that which accompanies it is deserving of implicit reliance, from the circumstances under which it was prepared and transcribed for me. The kos, according to which the computation of distance is made throughout, is that of Nepal, equal to two and a third miles; and the time in ghadís and pals is the same, according to which sixty pals make a ghadí, and two and half ghadís an hour. The embassy set off on 7th of Asar (June) and arrived at Peking on 12th of Mágh (January), halting 47 days which are included.

In the fifth column of the original the names of the passes, (langúr in Khas and lá in Tibetan) are not given. I have, however, set down in brackets such as I was enabled to procure before I left Nepal.

B. H. HODGSON.

Darjiling, September 25th, 1856.

Aborigines of the Nilgiris, with Remarks on their Affinities.—By
B. H. HODGSON, B. C. S.

In the autumn of last year I forwarded to the Society a series of Nilgirian vocabularies. This paper was printed soon after in the Journal, but without the accompanying prefatory remarks, which seem to have been accidentally mislaid and omitted.

I now forward some corrections and additions to that paper and shall take the opportunity to mention what, in substance, those prefatory remarks contained.

The Nilgirian vocabularies were prepared for me by the German Missionaries at Kaity, particularly Mr. Metz, and were then examined and approved by the venerable Schmid, who is now residing at Uttakamund, and who added some remarks, partly referring to his own valuable labours in Indian Ethnology, and partly consisting of corrections of my Ceylonese series of vocables. The latter are appended to the present paper.

When the Nilgirian vocabularies reached me, I immediately perceived that the verbs were not uniformly given in the imperative mood as required; and I therefore wrote again to Uttakamund desiring that this anomaly might be rectified, and also supplying some further forms, the filling up of which might furnish me with some few essentials of the grammar of the tongues in question.

The subjoined paper exhibits the result, and from it and from some further remarks furnished by Mr. Metz and others, I derive the following particulars relative to the people and to the grammar and affinities of their speech.

The form and countenance of the Nilgirians and especially of the Todas have now been spoken of for years as though these people differed essentially in type from the neighboring races and had nothing of the Tartar in their appearance. The like has been said also of the Hó or Lerka of Singhbhum. I have always been inclined to doubt both these assertions and I have lately had opportunity to confirm my doubt. My friend, Sir J. Colville, our Society's able President, having lately visited the Nilgiris I requested his atten-



T. Black, Litho Cal.

From a photograph.

A TODA WOMAN.

tion to the point, desiring him to procure me, if he could, some skulls* and photographic portraits. Of the latter he obtained for me two, which are herewith transmitted, and which Sir James sent me with the following remarks. "I am not much versed in these matters, and I confess I was at first insensible (like others) of the Tartaric traits you speak of, the roman nose and long beard of the Todas more especially making me fancy there was something Semitic in their lineage. But when I showed the passage in your letter to Dr. McCosh, he said you were right, and that in spite of the high nose, there were strong Tartaric marks, particularly in the women. The Badagas who are considered to be of as old date in the hills as the Todas, have a very uniform cast of countenance, not easily distinguishable from the ordinary inhabitants of the plains below the hills." These last are of course Dravirian or Tamulian, and the comparison drawn is therefore instructive, and doubly so when we advert to the indubitable evidence of language, which leaves no doubt as to the common origin of the highland and lowland, the uncultivated and the cultivated, races of Southern India, as we shall presently see.

Upon the origin and affinity of the highlanders Sir James observes, "People who know a good deal of the Todas say, that wherever they may have originally come from, they have less claim to be considered aborigines of these hills than the Kotas, not more than the Badagas, and are thought not to date higher than some 400 years in their present abode." Mr. Metz, the resident Missionary, who furnished the vocabularies, observes on this head, "The Kotas have so much intercourse with the Badagas that they are often not conscious whether they speak Badaga or their own language. Their original home was Kollimale, a mountainous tract in Mysore. The Kotas understand the Todas perfectly, when they speak in the Toda tongue, but answer them always in the Kota dialect, which the Todas perfectly understand.

Â Toda tradition states that the Todas, Kotas and Kurumbas had lived a long time together on the hills before the Badagas came. I know places on the hills where formerly Kurumba villages existed

* Neither Sir James nor any of the other parties, I applied to, could obtain for me any skulls.

but where none are now found. It is well known that the Kurumbas were driven down from the healthful summit to the malarious slopes of the hills, and I have strong reasons for believing that the Cromlechs and Cairns of the hills were made by the ancestors of the Kurumbas and not by those of the Todas, as is generally supposed by Europeans." In entire conformity with these views of the aspect and origin of the Nilgirians is the evidence of language which palpably demonstrates the relationship of the highland races to the lowland races around them. The amply-experienced and well informed Schmid has no doubt of that relationship, which indeed he who runs may read on the face of the vocabularies formerly and now submitted.* And it is well deserving of note that whilst that vocabular evidence bears equally upon the question of the affinity of the cultivated tribes around the Nilgiris, this latter affinity is now maintained as an unquestionable fact by the united voices of Ellis, Campbell, Westergaard, Schmid, Elliot—in short of all the highest authorities.

We may thus perceive the value of the evidence in question with reference to the uncultivated tribes, as to whose affinity to each other, and to the cultivated tribes, Mr. Metz writes thus, "When I came up to the hills, the Badagas told me that the language I used, which was Canarcse, was the Kurumba language." This reminds us of what we are told by another of that valuable class of ethnological pioneers, the Missionaries, who reports that "Speaking Tamulian of the extreme South, he was understood by the Gonds beyond the Nerbudda:" Nor can one fail to remark how this latter observation points to the great fact that Turanian affinities are not to be circumscribed by the Deccan, nor by the Deccan and Central India, nor, I may here add, by the whole continent of India but spread beyond it into Indo-China, Himálaya, and the Northern regions beyond Himálaya, irrespectively of any of those specially marked barriers and lines of separation which Logan and Muller have attempted to establish—the former, on physical and lingual grounds—the latter, on lingual only. My own conviction is, that we find *every where* throughout the regions now tenanted by the progeny of Tur, a large range of variation, physical and lingual, but one not

* See the Tamulian proper, the Ceylonese and the Nilgirian series.

inconsistent with essential unity of type, though the unity is liable, nay almost certain, to be overlooked, whether our point of view be anatomical, physiological, or philological, unless we carefully eschew confined observation such as misled Capt. Harkness about the appearance of the Todas, and not less Capt. Tickell about the appearance of the Hó. I have adverted to Harkness' mistake above. I will now add a few words as to my brother-in-law Tickell's. Last season Capt. Ogilvie, Tickell's successor, in the charge of that very district wherein the latter studied the Hó physical and lingual characteristics, came to Darjiling. I questioned him regarding the alleged fairness and beauty of the Hó, and well knowing that without samples before him, Capt. Ogilvie must be unable to give a definite answer, I produced from among the many always here, four no doubt unusually fair, well made, and well-featured Uráon and Múnda men, but still all in the service of one gentleman, and I then interrogated him. Capt. Ogilvie's answer was distinct, that the men before him were nearly or quite as fair and as handsome as the Hó of Singhbhúm, and not either in feature or in form essentially distinguishable from the Hó, whose lingual characteristics, again, we now know are so far from being peculiar that they are completely shared by the wide-spread tribe of Sontal, and almost as completely by the Múnda, Bhúmij, Uráon and Gónd, not to speak of other and remoter tribes of Himálaya and Indo-China having the widely-diffused pronomenalized verb type of the Turánian tongues.* Not that I would lay the same stress upon these nicer characteristics of language, as seems at present to be so much the fashion in high quarters. But on the contrary I would choose, as a Turánian philologist, to rely rather upon extent than depth of observation, still remembering that by far the greatest number of Turánian tribes are not merely unlettered, but too many of them also, for ages past, broken and dispersed, barbarously ignorant and miserably segregated, like the Nilgirians.

The niceties of such men's languages can never be accurately reached by us, unless we would devote a whole life to the research ;

* Viz. the Nága, Dhimáli, Háyu, Kuswár, Kiránti, Límbu, Chepáng and Bhrámu, of all which I hope soon to speak. All these tongues, of which the 1st is Indo-Chinese and the rest are Himálayan, belong to the pronomenalized class.

and, moreover, these niceties are certain to exhibit a great many anomalies, and to be now present, now absent, under circumstances, which, whether the absence were originally caused by impatient rejection, by casual nondevelopment, or by spontaneous or factitious decomposition, must detract greatly from the value and certainty of any inferences founded thereon; whilst in regard to the more civilized tribes, we often positively know and may always prudently suspect that *their* lingual refinements, when they differ from those of the ruder tribes, are so far from being special illustrations of the true *norma loquendi* of the Tartars that they are exotic and borrowed traits. From this digression (which has reference to Müller's remarks on the relative value of vocabular and grammatical evidence) I return to my subject by giving the following observation of Mr. Metz upon the affinity of the several Nilgirian tongues now before us, merely premising upon the interesting subject of the character and habits of these tribes what Sir James Colville in his recent visit heard and observed. "They are idle, dirty, intemperate and uuchaste. Polyandry has always existed among them, and their women are now addicted to general prostitution with men of other races, so that they must soon die out, and, in fact I think the population is scantier than it was when I was last here, though so few years back." Upon this, I may remark that the traits observed in the Nilgiris are thoroughly Tartar, and as such are widely prevalent in the Himálaya and Tibet. Even the civilized tribe of the Névárs, who, by the way, have a recorded tradition uniting them with the Malabár Náirs—a name identical, they say, with Névár or Névár (y and w being intercalary letters) were once polyandrists and are still regardless of female chastity, whilst the Tibetans were and are notoriously both.

Mr. Metz on the subject of the dialectic differences of the Nilgirian tongues observes:—

"The differences of the several languages of the hill tribes consist, not so much in idiom as in mere pronunciation. But that is so great that the same or nearly the same word in the mouth of a Toda with his pectoral pronunciation can scarcely be recognized as the same in the mouth of a Kota, with his dental pronunciation. The Badaga and Kurumba dialects are midway between the former

two with regard to pronunciation, only the Badaga is a little more guttural than the Kurumba.

“There is some difference even in the speech of the several branches, or remotely located groups, of any one tribe. For instance, those of the Badaga tribe who, like the Kangaru or Lingaits, emigrated from Targuru and came to the hills at a later period than the others, speak a purer Canarese than the common Badagas. So also the Todas among themselves have differences of pronunciation according to the different districts they inhabit; for instance, some pronounce the *s* quite pure, others like *z* and others again like the English *th*. And in like manner the Kurumbas round the slopes of the hills have so many little variations in their speech according to the situation of their villages (Motta) on the south, east, or west side of the hills, that it is difficult to say what the real Kurumba tongue is. In Malli, the chief Kurumba place on the south slope, the language is much mixed with Tamil.”

I will now conclude with a few remarks on the grammatical traits exhibited by the subjoined papers.

Phonology.

As much as is forthcoming on this head, has been expressed in the vocabular part of this paper and the remarks appended to it. It may be advisable, however, to repeat here that the presence of the English *th*, and its frequent substitution for *s* and *z*, and the equivalence of the two latter, are so far from being exclusively Toda, as Schmid supposed, that they are common in Indo-China, Himálaya and Tibet. Tibetan abounds in sibilants, having, besides the *s*, *ch*, series, an equivalent *z*, *zy*, *dz*, series. The former is possibly borrowed. At all events *z*, *zy*, *dz*, and *ts*, *tch*, are very much commoner in use than the Arian *s*, *ch*, series. The second *z*, represented by me by *zy*, and equal to the French *j* in *jeu*, is the same with the Tamil *zh* of Ellis and Elliot. It is a very prevalent sound and equally prevalent is the French *u*, or *eu* in *jeu* aforesaid. Neither is ever heard from an Arian mouth; but the Himálayans most infected with Arian ways and habits are now gradually substituting Arian *j* for their own *z* and Arian *u* for their own *eu*. *ḍ* is also taking the place of their hard and aspirated *z*, (*dz* and *zh*) and thus

the Tibetan word *zhí-ká-tsén* and Newari *zhí-khá-chhén*,* the name of the capital of Tsáng, has become *Dígarché* with those who use the popular and spreading Khas language, which language we hereby perceive also preferring sonants to surds (g for k), whereas the written Tibetan and Newari, like the Tamil and Toda, have a preference for surds.

But Tibetan is spoken with all the variety of hard and soft pronunciation noticed by Mr. Metz as characterizing spoken Toda and indeed the whole of the Nilgiri dialects; and, as there are few things more normally Turánian than the wide extent of legitimate, habitual commutability between the consonants and vowels of the languages of the family, so I consider that to lay so much stress as is often done on merely phonetic peculiarities is a great mistake on the part of Turánian ethnologists and one apt to lead them much astray when in search of ethnic affinities. For example, the Myamma is questionless one language notwithstanding that its phonetic peculiarities in Ava and in Arakan are very marked; and a particular friend of mine who is “genuinely Saxon, by the soul of Hengist” can by no means deal fairly by r, sh, or th, but calls hash, has; shoes soes or toes or thoes; brilliant, bwilliant; there, dere; thought, tought, &c. A Londoner is not less Saxon surely because he is wont to “wow that weal, wine and winegar are wery good wittals.”

* The etymology of this word is curious and important with reference to the evident identity of the term in Tibetan. And it is hardly too much to say that the family identity of the two tongues (Newári and Tibetan) might be rested on it.

It means in Newári “the four-housed,” *zhi* or *zyi*, being four; *khá* the generic sign for houses; and *chhén* being house. De Coros has said nothing about that most fundamental sign of the Turánian tongues, the generic or segregative signs; but I have good reason to assume that this is one of the several serious defects of his grammar and that *Tibetán ká* is = Newári *khá*, as *zhi* = *zhi*, and *tsén* = *chén*, though *khyim* be now the commoner form of the word in written Tibetan. *Zhi-kha-chhén* or *zhí-ka-tsén* Turanice, = *Dígarchén* Arianice, is the name of the capital of Tsáng—why styled “the four-housed” I cannot learn. But three *such* elements composing one word identical in form and in sense in two separate languages involves the family oneness of those languages.

Article.

Mr. Metz says, there is none whatever, but I feel pretty sure that the usual equivalents are recognized; viz. the numeral *one*, or the indefinite pronoun, *some, any*, in lieu of the indefinite article; and the demonstratives in lieu of the definite, as also the segregatives *van, val, and du* for the three genders, or *ál* and *pé* for the major and minor of gender, used as suffixes and widely applicable to nouns (qualitives)—less widely and uniformly to verbs. We should always remember that the so-called segregatives or generic signs are essentially articles, definite or indefinite according to the context.

Adjective.

All qualitives, which seem to embrace, as usual, the nominal (genitive), pronominal, participial, numeral and adjectival, appear to be used both substantively and adjectivally, and, when employed in the former way, to add to their crude, as a suffix, the appropriate generic sign, which in the case of the participle, gives it a relative sense or an agentive, just as in English, *the* or *a striker*, or *the* or *a striking person (or thing)*, and *the* or *a hard thing*, are equivalent respectively to *the person who strikes* and *the thing which is hard*. But the latter form of speech is quite Anti-Turánian.

Qualitives are always prefixed when not used affirmatively or substantively. If placed after the noun they become affirmative including in their sense the substantive verb. *Man (is) mortal*. *That (is) mine*. *This the striker = this is the person who strikes*.* *He (is) loving one or lover, = one who loves*. *That one (is) the black = that is the black one*. Give me *the black = the black being or thing*—a difference which must be expressed and with the sign of gender too (an *ál*) in the former event. *This person two person = this one is the second person* (rend-*ál*),† &c. Gender is fully marked in qualitives by the use of the suffixes *van, val, du = hic*,

* In Newári it would be, *ú-hma dáya-hma*, which is in every particular of idiom Dravirian, *hma* being the *van* or *ál* suffix of the above tongues and its affixing to the verbal form rendering that a relative participle.

† Here final *ál* is not the contracted sign of the feminine suffix *aval*, but is the name for man, used as a suffix.

hæc, hoc. But these forms are very imperfectly reproduced in the verb, indeed cau hardly be traced except in Badaga and Kurumba where the following is unmistakeable evidence of them.

	<i>Badaga.</i>	<i>Kurumba.</i>
He strikes.	Hui-d-an.	Hui-t-an.
She strikes.	Hui-d-al.	Huiyu-t-al.
It strikes.	Hui-d-ad.	Huiyu-t-ad.

The major and minor of gender in beings, not things, seem to be denoted by ál and pé suffixes—words having still the independent signification of mau and woman. In Toda, moreover, adum marks the common gender, as a separate pronoun, and tan, as a conjunct prefix. I am not sure as to the major and minor of gender, because the verb does not exhibit them in the peculiar manner of the cultivated Dravirian tongues, or otherwise.

Noun.

The papers furnish no sample of declension, but it may be safely inferred that it is simply postpositional with cases ad libitum, or none at all, according to the view taken of declension. Gender is marked either by separate words, such as *man, woman; cock, hen*; or, by sexual prefixes like our *he-goat* and *she-goat*; or, lastly, the generic word bears also a male or female sense, when the feminine or masculine gender, as the case may be, is distinguished by the fitting sign prefixed. So Burmese *sa* means *child* and *boy*, and *mí-sá*, or *female child*, means *girl*. I know not whether the suffixes *van, val* and *du*, or *ál* and *pé* (*pen, pem*—the latter equal major and minor of gender) are added to substantives as well as to qualificatives, but I think not. Instances occur in Telegu but not generally in the Dravirian tongues, nor in the northern.

The major and minor of gender (quasi, *hic et hæc facilis; hoc, facile*) are common in the Himálaya, Indo-China and Tibet, but I have nowhere in the north found the fully developed masculine, feminine, and neuter of the south.

In regard to number, the Nilgirian nouns are very defective, having no distinct and uniformly employed dual or plural inflexion or sign. But they seem to follow the cultivated Dravirian in so far as having no dual, but having the double, or exclusive and inclusive, plural, at

least in the separate pronouns and in the personal endings of the verb. Irula has not even the latter. In the Himálayan tongues it is often difficult to make out distinct dual and plural forms of the substantive, even when the distinct and conjunct pronouns exhibit an exclusive and inclusive form both of the dual and of the plural of the first person, with correspondent verb forms as is the case in the Kiranti language. The source of the defective plural sign of nouns is to be sought in the fact that Turanian vocables generally in their crude state bear the largest and specific or generic meaning—a peculiarity well exemplified by the English word, *sheep*. In the Nilgiri tongues neuter nouns always lack, says Mr. Metz, a plural form. Masculine nouns form it occasionally by changing final *n* into *r* in Toda (Kullan, *a thief*; kullar, *thieves*) or by adding the plural sign *kal vel gal* in Badaga and Irula.

Pronouns.

Pronouns and pronominal forms are greatly developed in the Nilgiran languages, as in all the Turanian tongues, reminding us, when viewed in connexion with the paucity of true conjugational forms, of the fine remark that “rude people think much more of the actors than of the action.” We have in the Nilgiris, 1st, personal and possessive forms; 2nd, among the former, forms excluding and including the person addressed (*we—not you*; and *we—including you*); 3rd, among the latter or possessives, two complete series according as the pronouns are used conjunctively or disjunctively. I have given all these; and their forms, changes of form and uses, would alone suffice to prove the perfect identity of the Nilgiran tongues with those of the cultivated Dravirian class. The conjunct pronouns are prefixed to nouns, suffixed to verbs. But those which denote genders (proper to the 3rd person only) are used suffixally with all qualitative nouns, which thus pass from the adjectival to the substantival category. This latter peculiarity is common to the Himálaya and Tibet, and is found even among the nonpronominalized tongues, such as written Tibetau and Newári, and likewise among the Indo-Chinese tongues, whose *wong, pong* is clearly the Dravirian *van*. The former also is found in the Himálaya, but of course among the pronominalized languages only. But among them we have samples of the conjunct pronoun being used prefixally with

nouns and suffixually with verbs as in the Dravirian tongues,* and others of the use of both suffixually, as in the West Altaic and Ugrofinnic groups of languages.* Separate words meaning two and all can be added to pronouns (and to nouns) to form duals and

* Two Forms.					
Háyu	$\left\{ \begin{array}{l} \text{am-pa} \\ \text{um-pa} \\ \text{wa} \\ \text{u} \end{array} \right\} \text{-pa}$	$\left\{ \begin{array}{l} \text{ang-upa} \\ \text{ung-upa} \\ \text{wathim-pa} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{My} \\ \text{Thy} \\ \text{His} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{father} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{To'-p-mum} \\ \text{To'-p-num} \\ \text{To'-p-t-um or} \\ \text{To'-p-um} \end{array} \right\} \left\{ \begin{array}{l} \text{struck me.} \\ \text{struck thee.} \\ \text{struck him.} \end{array} \right.$
Kiránti	$\left\{ \begin{array}{l} \text{a-pa} \\ \text{i-po} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{,,} \\ \text{,,} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{My} \\ \text{Thy} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{father} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Tip-t-óng} \\ \text{Tip-t-ú} \end{array} \right\} \left\{ \begin{array}{l} \text{I} \\ \text{Thou} \end{array} \right\} \left\{ \begin{array}{l} \text{struck.} \end{array} \right.$
Báhing	$\left\{ \begin{array}{l} \text{a-po} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{,,} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{His} \end{array} \right\}$		$\left\{ \begin{array}{l} \text{Tip-t-á} \\ \text{He} \end{array} \right\}$
Kiránti	$\left\{ \begin{array}{l} \text{ung-pa} \\ \text{am-pa} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{,,} \\ \text{,,} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{My} \\ \text{Thy} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{father} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Mo-v-úng} \\ \text{Tá mó-v-ú} \end{array} \right\} \left\{ \begin{array}{l} \text{I} \\ \text{Thou} \end{array} \right\} \left\{ \begin{array}{l} \text{struck.} \end{array} \right.$
Bontáwa	$\left\{ \begin{array}{l} \text{eu-pa} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{,,} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{His} \end{array} \right\}$		$\left\{ \begin{array}{l} \text{Mó-v-eú} \\ \text{He} \end{array} \right\}$
Kuswar	$\left\{ \begin{array}{l} \text{baba-im} \\ \text{baba-ir} \\ \text{baba-ik} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{,,} \\ \text{,,} \\ \text{,,} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{My} \\ \text{Thy} \\ \text{His} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{father} \end{array} \right\}$	$\left\{ \begin{array}{l} \text{Thatha-im} \\ \text{-ik-an} \\ \text{Thatha-ir-} \\ \text{ik-an} \\ \text{Thatha-ik-} \\ \text{an} \end{array} \right\} \left\{ \begin{array}{l} \text{I} \\ \text{Thou} \\ \text{He} \end{array} \right\} \left\{ \begin{array}{l} \text{struck.} \end{array} \right.$

REMARKS.—The Háyu conjunct pronoun (see 1st form) is falling out of use. Form 2nd gives the full possessive before u-pa used for father though it be literally a father, any father, his father, pater illius vel istius vel ejus vel cujusvis præter me et te. The verb is given in the objective or agento-objective form = the passive, the active voice no longer showing clearly the pronominalization. There is now used instead of this form and perhaps ever was (it is a question of decomposition *versus* non-development) in the *active* voice the form seen in the sequel in Khwa-chammi, I, thou, he, feed (self.) Here it would be to'-p-ummi, or top-t-uummi, (p = Bontava v, being the transitive sign, iterated, or not, in the form of t) I, thou, he strike, or struck, or will strike. In Báhing also, which has a clear discrimination of time into present cum future and past, the former is ti-b-ú, ti-b-í, ti-b-á, I, thou, he strike or will strike. In these samples, we see, again, the transitive sign b = p = v, and this sign discriminated clearly from the temporal sign or t. The manner in which pá becomes pó in the Báhing noun; pá, my father: pó, = pa-u, any body's father, is most suggestive and should warn us against laying such undue stress on the position (prefix or post-fix) of the conjunct pronouns. Frequently both are used, the former being in the full separate form and the latter in the contracted, as in the Altaic tongues, and not less in Southal and Hó and indeed in all. Kuswar beautifully demonstrates the character of the infixed pronoun as a mark of the transitive verb, and it will be seen that this language inverts the order of the agentive and objective, and adds a common termination or an. The neuter verb of course omits the transitive sign and runs thus, walg-en-im, walg-en-ir, walg-en, I, thou, he fell. En is possibly the participial particle. But it is more probably the neuter sign.

plurals, and are often added to a true inflective plural pronoun to mark that distinction; thus, *nam* = *we*; *namella* = *we all*, plural; *nam rendálu* = *we two*, dual. Sometimes the pronominal inflexion is repeated, as in *emellam*, *we* (or *we all*); *niv ellam*, *ye*; *avar ellam*, *they*, of Toda.

Verb.

The verbal forms of the Nilgiri tongues clearly place them in the same category with the cultivated Dravirian, that is, the pronomenalized class. But, whether from non-development or from decomposition, the pronomenalization is very imperfect on the whole. Nor is it easy to discern in the one or other group of these southern tongues those generic and temporal signs which are still so palpably traceable as a distinct element of the northern tongue verbs. All of the pronomenalized class, and some that can hardly be ranged in that class, in the Himálaya, as in Altaia and Ugrofinnia, have the verbal root or imperative followed by the transitive or intransitive (often with many subdivisions) sign, and that, again, in the pronomenalized class, by the personal ending, which too is sometimes agentive, sometimes objective (equivalent to active and passive voice respectively) and sometimes both, in which case the agentive form always follows the other and makes the ending. But, even in the northern tongues, the transitive or intransitive sign is constantly confounded with the temporal sign, whilst the personal endings likewise sometimes exhibit as much irregularity and defectiveness as they do in the Nilgirian verbs. Nevertheless, judging by analogy and resting on the wonderful similarity of genius and character pervading all the languages of the sons of Túr, I should not hesitate to say that the cultivated Dravirian and the Nilgirian tongues are framed on the same model as that above described as belonging to the northern, and that the samples above cited from Badaga and Kurumba are palpable proofs of it, notwithstanding the silence of all Dravirian grammarians touching the generic or class sign (transitive, intransitive, &c.) of their verbs. For example :

I have no doubt whatever that

Badaga	hui-d-an	} I struck (him).	} Active voice.
Kurumba	huiyn-t-an		
Kurumba	mad-id-en	I made (it)	
May be analysed precisely as are—			
Turkic	sever-d-im	I loved (him)	
Hungarian	var-t-am	I waited for (him)	} Passive voice.
Kiranti (Báhing)	tip-t-ong	I struck (him)	
Háyu	top-t-um	struck him	} Passive voice.
Khamti	há-t-o	gave him	
Háyu	há-t-um	gave him	} Active.
Kuswar	tha-tha-im- ik-an	I struck (him)	

and numberless others of which I shall have, ere long, to speak in full. That is to say, I hold it for certain that all these verbal forms consist of, 1st, the root or crude, 2nd, the transitive and preterite sign, 3rd, the personal ending; and that moreover, the 2nd of these elements may, in every case, be resolved into the 3rd pronoun, current or obsolete, and used objectively. Kuswar baba-ik, = *his father* compared with tha-tha-ik = *strike* (i. e. him, the object) settles the last point even more clearly than Samoiède lata-da = *his stick* and Magyar Cicero-t = *Ciceronem*.*

Having mentioned the wonderful analogy of these tongues I will give a telling instance. In the Háyu language of the central Himálaya and in the Mantchu we have khwachambi or khwachammi, = *I feed*, that is to say, *feed myself*; for, khwá, vel khóá, is the root; chá, the reflex sign; and mbi vel mmi, the personal ending, and one too that in both tongues is invariable, though Háyu appears sometimes to drop the iteration in the 2nd and 3rd person, khwachammi, khwá-chá-m, khwá-chá-m, *I, thou, he, feed (self)*. Now, that root, reflex sign, and personal ending should thus concur to absolute identity, and that sense also should be as identical as form, in two unconnected languages, is simply impossible. It follows therefore, that we have people of the Mantchu race forthcoming now in the central Himálaya close on the verge of the plains! And, again, what shall we say to such grammatical coincidences as—

Túrki Baba-im = my father, sever-im = I love.

Kuswár Baba-im = my father, saken-im = I can.

The answer is clear, that we have people of the Turkic stem also

* Muller apud Bunsen, I. 319.

in the central Himálaya, close to the verge of the plains of India. Nor need we doubt that such is the case in regard both to the Mantchuric and Turkic relations of the Himálayans, though the precise degree of such family connexions can hardly become demonstrable until we have (what is now alas! wholly wanting) a just definition of the Túránian family and of its several subfamilies to test our Himálayan analogies by. The Mantchuric and Mongolic groups of tongues were long alleged to show no sign of pronominalization. It is now known that that was a mistake.

Other still maintained distinctions will, I anticipate, disappear before the light of fuller knowledge, when it will plainly appear that not mere and recent neighbours, such as are alleged to be the Tibetans proper of our day (Bodpas), formed the Túránian element of Indian population, from the Himálaya to the Carnatic, but successive swarms from the one and same great northern hive—whether Turkic, Mongolic, Mantchuric, or these and others—who passed into Indo-China as well as India, and directly into the latter, as well as through the former into the latter, by all the hundred gates of the Himálaya and its southern offshoots. Simple as the Mongolic and Mantchuric languages are wont to be called, they seem to me to possess entirely the essential Túránian characteristics, that is, in like manner as they have endless noun relational marks without any distinct declension, so they have a rich variety of sorts of verb (but all reducible into the two great classes of action, or that of things and that of beings, equal neuter and transitive) and this peculiar richness united with great poverty of voice, mood and tense, whilst the participles partake fully of this character of the noun and of the verb, that is, they are poor on one side but luxuriant on the other, and throughout the whole Túránian area perform the very same function or that of continuatives, being employed to supply the place of conjunctions and conjunctive (relative) pronouns.

The central Himálayan languages, but perhaps more especially those of the pronominalized type, all present these characteristics with perfect general fidelity and with some instances of minute accord, besides those cited above, among which may be mentioned the hyper-luxuriant participial growth of Kiránti and of Mantchu, both of which have ten or rather eleven forms of the gerund, and these obtained by the very same grammatical expedient!

The general absence of a passive, the partial or total absence of tense distinctions, and the combination of the present and future when there *is* such partial distinction, as well as the denoting of tense by annexed adverbs (to-day, yesterday and to-morrow) when there is *none*, are Túránian traits common to the (not to go further) Altaic, Himálayan and Tamulian tongues. Thus, the Toda and Kota verbs are always or generally aoristic and the three tenses are expressed by the above adverbs of time, used prefixally. Precisely such is the case with the Bontáva dialect of Kiránti and with the Háyn, whilst the Báhing dialect of Kiránti discriminates the past tense from the other two by the use of an appropriate infix which is at once the transitive and temporal sign. If such be not visibly the case with the Badaga, Kurumba and Irula dialects, we may yet discern the cause, partly in the carelessness of barbarians, partly in that fusion of transitive and preterite signs which cultivated Dravarian also exhibits, and, not less, Ugrofinnic and Turkic. But in the Tin-d-é of Badaga and Kurumba and Tid-d-é of Kota, = *I ate*, as in the Mad-id-é of Kurumba, = *I made*, not to cite more instances, I perceive that identical preterite sign (t, vel, d) which marks it in Báhing (tib-á, *he strikes*; tib-d-á, or tip-t-á, *he struck*), as in endless other northern and north-western tongues.

I will add a few more words on these important points for I conceive that the passive of the cultivated Dravirian tongues is clearly factitious and suggested by contact with Arianism. There are still extant long works in Canarese, says Mr. Metz, in which hardly one instance of the use of the passive voice occurs, and the fact that the *uncultivated* Dravirian tongues have it not, is I think decisive as to its adopted character in the cultivated. Again, there can be no doubt that the negative conjugation of the cultivated Dravirian tongues presents the primitive form, and that form is aoristic, e. g. mad-en, *I do, did, or will, not make*. In Himálaya and Tibet and Sifán the passive is wanting. Its absence is supplied by the use of the instrumentive and objective cases of the pronouns for the active and passive forms respectively. Even Khas still adheres to this primitive and indigenous form, overlaid as that tongue is by Arian forms and vocables, and I have myself not the least doubt that the anomalous né of the preterite of Hindi and Urdu

is nothing but a commutative equivalent of the Khas instrumental sign *lé*. A Khas of Nepal invariably says, *by me struck*, for *I struck*, and *me struck* for *I was struck*; and moreover there is still the strongest presumptive proof, internal and external, that this, the present preterite, was a primitive aorist and the only tense in Khas. Those who are fully conversant with the spoken Prákrits of the plains can testify that the same traits still cleave to the vernaculars of the so-called Arian class of tongues in the plains—traces, I conceive, of primitive Turánianism as palpable as are to be found in the secondary terms (*bhat-wat*, *mar-dal* (vide infra), *kapra-latta*, &c.) of the Prakrits, and which their grammarians can only explain by calling them tautological sing-song. That all such terms are really genuine samples of the double words so common throughout the Turanian area, and that the latter member of each term is Turanian, I trust by and by to have time to show. Meanwhile and with reference to the Tartar substitute for the voices, here are a few examples.

By me struck, = *I struck*, active voice.

Tibetan, Ngági dúng: Newári, Jing dáya: Háyu, G'ha toh'mi: Khas, Mailè kútyo: Urdu, Main nè kúṭa.

Me struck = *I was struck*, passive voice.

Tibetan, Ngála dúng: Newári, Jita dála: Háyu, Go toh'mi: Khas, Manlai kútyo: Urdu, Mujh ko kúṭa (subaudi, usnè).

The languages which employ conjunct suffix pronouns have a form precisely equivalent to the latter, e. g. Sontal dál-éng, and Háyu toh'-múm = *struck me*. And observe that Sontal dál *to strike* reproduces, not only the wide spread dá vel tá root of the north, but also the l of Newari dála,* as to which see remarks on the transitive and preterite sign aforegone, and Urdu már-dál with its comment.

* Observe also that Jita dála reproduces the objective sign, ta vel da, above spoken of. Compare *latada* and *Cicero t.* As a transitive sign of verbs it is most widely diffused, and nearly as widely are *ka vel ga*, and *pa, vel ba, vel va*. *Sa vel cha* is a very widely diffused neuter sign which also can be traced indubitably to the 3rd pronoun used to denote the object—in this case, the agent himself or itself. The French forms, *Je lève* and *Je me lève*, &c. very well serve to indicate the latter form, though not the former of Turanian verbs.

With regard to the personal endings or pronominal suffixes of the Nilgirian verbs, their obscurity is sufficiently conformable to the cultivated Dravirian models with due allowance for mistakes on the part of the rude speakers of the former tongues. Something may also be ascribed with probability to decomposition and disuse. But upon the whole we cannot doubt that these tongues belong to the pronominalized class, and that, for example, the *ni* and *mi* of Toda *tinsbi-ni*, *I eat*, *tinsbi-mi*, *we eat*, with the *an*, *al*, *ad* of Nidre-maḍut-an, maḍut-al maḍut-ad, *he*, *she*, *it*, *sleeps* of Kurumba, are instances of suffixed pronouns. And now, having already remarked sufficiently upon the other peculiarities of the Nilgiri pronouns under the head of "pronoun," I shall here bring these remarks, suggested by the Nilgirian vocabularies, to a close.

P. S.—Of the many resembling or identical words in the Himálayan and Dravirian tongues, I say nothing at present. Those who meanwhile wish to see them, have only to consult the several vocabularies printed in the Journal.

But with reference to what I have stated above, that there exists an authentic tradition (reduced to writing some five hundred years back) identifying the people of the Malabar coast with those of Nepal proper (or the Newár tribe) I may just point to such words are *wá vel vá* = *come*, and *sumaka* = *silent*, as perfectly the same in form and meaning both in the Newár language and in that of the Nilgirians.

English.	Toda.	Badaga.	Kota.	Kurumba.	Irula.
Eat	Tennu	Tinnu	Tinnu	Tinnu	Tinnave, Tinduko, (the latter to a superior)
Drink	U'nú	Kuḍi	U'ne	Kuḍi	Kuḍidukove. Kuḍi- dukoveko
Sleep	Vorg	Voragu	Vorage (g = ger- man g.)	Nidre maḍu (<i>Sleep make</i>)*	Kadandukove. Ka- danduko
Wake	Vorigadi chagirt†	Yecharagiru (<i>awake be</i>)	Yecharike iru (<i>A- wake be</i>)	Yecharikeagiru (<i>A- wake be</i>)	Nénevá girave
Laugh	Kari	Négé	Kárije	Nage	Girkáḍu
Weep	Arthti	Lau (au = ou)	Age (g = german g.)	Alu	Alave
Speak	Arvor	Nuḍi (u = oo)	Manivo	Matádu. Nuḍi	Pésu
Be silent	Bokir	Sumagiru, Japaniru	Pakiru	Symairu (<i>Silent be</i>)	Maniadeiru (<i>Speech- less be</i>)
Come	Itva? Vá, (It-va = come here)	Ba. Iti ba? (Iti-ba = come here)	Váge	Ba	Barave
Go	Ato? Fo, (At-fo = go there)	Hógu. Ate hógu? (Ate hógu = go there)	Athóge? Hóge, (At hóge = go there)	Hógu	Bhó
Stand up	Mklo	Lyettu	Méke	Yeddu	Yéndu kove
Sit down	Neshkir (<i>be down</i>)	Kuli	Kúkiru (<i>Be down</i>)	Kutukó	Ukandu kove
Move, walk	At nar? Nar, (At nar = walk there)	Nade. Ate nade? (Ate nade = walk there)	Nade	Nade	Nañandu kove
Run	Vór	Vódu	Ate vódu	Vódu	Vódu
Give	Ta. Kor	Ta. Koḍu	Ta	Koḍu	Tárove
Take	Tegi. Yettfo (<i>hav- ing taken go</i>)	Tegi	Véde	Tegi	Bóngu
Strike	Burv	Hui	Puiye	Hui	Adi

* The brackets denote suggestions of my own.

† Ch = kl. English ch represented by tsh. Former = guttural Scotch ch in loch, &c.

English.	Toda.	Badaga.	Kota.	Kurumba.	Irula.
Kill	Birshkir. Koddu	Kodd hóku	Tavarsidade	Kondu hóku	Adidukove. Kondu- kove
Raise, lift up	Tach* Atvei	Tóku Háku. Idu. Atobi, (Ate bi = <i>put there</i>)	Mékarse Vei	Tóku Ate idu	Túkove Bhodu
Put down	Vorañir	Kte. Vorañiru, (<i>hear-ing be</i>)	Vóruñulle	Kelu	Kékukove
Hear					
Understand	Aridir	Aridiru. Aridutto	Arsulle	Ariduko	Arindiru
Tell	Esit	Hlegu	Parde	Helu	Sollu
Strike	Burv	Hui	Puiye	Hui	Adi
Strike not	Burhtati	Huiya béda	Puiyade	Huiya béda	Adio-veñda
To strike	Burken	Huiya	Pukede	Huiya	Adia
Striking	Burhtip	Huiyuva	Puika	Huiyuva	Adika
Stricken	Burhte (used actively as well as passively, see remarks.)	Huida	Possa	Huida	Añida
The striker or He who strikes	Burhtpavan or Burhtipál (= <i>striking man</i>)	Huiyuvavannu (van or vanu is masculine suffix, and ál or álu = <i>man</i> is equivalent. The two forms therefore are but one)	Puikáñ Puikálu	Huiyuvava Huiyuva álu	Adikálu Adika
Having stricken	Burhtudd	Huiyuva álu	Possutte	Hui du gondu	Adidu
I strike	Burhtsbini, or Burhtversbini	Huida. Huidundu	Añe puikape	5) Huiyutine	Ná adi kallave
I struck	2) No preterite	Huide	Añe possupe	Huide	Ná adide
I will strike	No future	The present tense is used.	Present tense is used	Present tense is used	Ná adike

* Cl. = kh. English ch represented by tsh. Former = guttural Scotch ch in loch, &c.

I sleep	An vorchsbini	Ná voragine. grunnane	Voragape or Inde ⁵	Nidre mađutine	Ná kađandu kóge
I slept	No preterite.	Ná voragidde	3) Voragape or Nér	Nidre mađide (sleep made I)	Ná kađandu kónde
I will sleep	No future.†	Ná voragine	Voragape or Nálke	Present tense.	Ná kađandu kóge
I eat	Tetthbini. Tinsbini	Tinnane	Tingape	Tinnutine	Ná tindu kóge
I ate	No preterite.	Tinde	Tidde	Tinde	Ná tinde
I will eat	No future.†	4) Tinnane	Tingape	Present tense.	Ná tinge
I see	Notthbini. Kadders bini	Nóđine	Nósigape	Kandane. Kanutine	Ná pátu kóge
I saw	No preterite.†	Nóđide	Nósipe	Kande	Ná pátu kónde
I will see	The future is the same as the present tense in all these tongues.				
I sleep	Vorchsbini	Voragine	Voragape	Nidre mađutine (sleep make I)	Ná kada ke. Ná kađandu kóge
Thou sleepest	*Vorchsti	*Voragire	Voragape	Nidre mađuti	Ní kađandu kónde
He sleeps	Vorchsti	Voragina	Voragapo	Nidre mađutane	Avanu kađandu kónda
She sleeps	Vorchsti	Voragla	Voriglo	Nidre mađutale	Avla } kađandu
It sleeps	Vorchsti	Voragida	Vorigo	Nidre mađutade	Avala } kondala
We two sleep	No dual in any of these languages.				Adu kađandu kónda
We all sleep. Inclu.	Amellam vorchsbini	Angella voragineo	Amella vorigame	Navella nidre mađute	These have been casually omitted by Mr. Metz.
We all sleep. Exclu.	Emellam vorchsbini	Yengella voragineo	Emella vorigame	Yengella nidre mađuteve	
Ye all sleep	Nivellam vorchsbini	Ningella voragiari	*Vorigire	Nivella nidre mađutiri	
They all sleep	Avarellam vorchsbini	Avakaella voragiari	Vorigoro	Avarella nidre mađutare	

About the Passive see Remarks.)

* For omitted pronouns see elsewhere.

† Adverbs of time used to mark tense. I sleep yesterday = I slept. I sleep to-morrow = I will sleep.

<i>English.</i>	<i>Toda.</i>	<i>Badaga.</i>	<i>Kota.</i>	<i>Kurumba.</i>	<i>Irula.</i>
I cause to kill	I have found no form for this.	Koddhákisine	Tavarsiken	Kondhakisutine	Ná kollisé vittige
I cause to make	"	Madisine	Kesiken	Madisutine	"
I cause to love	"	"	"	"	Ná pria pannisige
I love	"	"	"	"	Ná pria panni kan-dirige
I strike	*Burthtsbimi	Huidane	*Puikape	Huiyutine	Ná adikallave. Ná adida vittige
Thou strikest	Burthtsi	Huidere	Ni puikape	*Huiyuti	Ni adika
He strikes	Burthtsi	Huidana	Avane puikapo	Huiyutane	Ava adika
She strikes	Burthtsi	Huidla	Avale posso	Huiyutale	Avla adika
It strikes	Burthtsi	Huidada	Adu posso	Huiyutade	Adu adika
We two strike. Dual	Dual is the same as plural; adding only the numeral <i>two</i> after the	plural; adding only the numeral <i>two</i> after the	numeral <i>two</i> after the	pronoun instead of ella	ella = <i>all</i> .
We all strike. Inclu.	Am ellam burthts-bimi	Angella huidaueo	Amella puiyame	Angella huiyutevo	Nanella adikemet
We all strike. Exclu.	Em ellam burthts-bimi	Yengella huidaneo	Emella puiyame	Yengella huiyuteve	The same.
Ye all strike	Nivellam burthtsi	Ningella huidari	Nimella pórasire	Nivella huiyutiri	Nimella adikiri
They all strike	Avarellam burthtsi	Avarella huidara	Avarella posso	Avarella huiyutare	Avarella adikaru
A dog	Noi	Nai	Nai	Nai	Nai
Two dogs. Dual	Aed noi	Yeraðu nai	Aed } Nai	Yeraðu nai	Reðu nai
Dogs. Plural	(1) No plural.	Naigla	Yede } (1) No plural. (See Naigalu	Remarks)	No plural for neuters.
A Father	Eiyan	Appa. Tando	Eiyane	Tande	Amma
Two fathers. Dual	It is wanting	It is wanting	It is wanting	It is wanting	It is wanting
Fathers. Plural	It is wanting	It is wanting	It is wanting	It is wanting	It is wanting
A father. Indefinite	} No such distinction exists in any of these languages.				
The father. Definite					

* For omitted pronouns see elsewhere.

† Dual is not a separate form, but rendu = 2, is added after pronoun instead of ella, as Nam rendál adikeme, &c.

My father	Yen eiyane	Yenna appa	Yen eiyane	Nana tande	Yenuḍ amma
Thy father	Nin eiyane	Ninna appa	Nin eiyane	Nina tande	{ Ninuḍ } amma { Ninoḍ }
His father	Tan eiyane	{ Avana } appa { Ava }	Avan eiyane	Avana tande	Avanuḍ amma
Her father	Tan eiyane	Avla appa	Aval eiyane	Avala tande	Avaluḍ amma
Its father	Tan eiyane	Aduna appa	Adun eiyane	Adana tande	Aduna amma
Our father. { Excl. }	{ Em eiyane }	Yenga appa	Ema eiyane	Yenga tande	Yemmuḍ amma, for both
Your father	{ Am eiyane }	Anga appa	Ama eiyane	Nama tande	Nimuḍ amma
Their father	Nim eiyane	Ninga appa	Nimud eiyane	Nima tande	Avaruḍ amma
I Ego	Avar eiyane	Avara appa	Avara eiyane	Avara tande	Nā. Nānu
My	An. Anu	Nānu. Na	Ane	Nānu. Nā	Yennuḍ. Yennuḍ
Mine	Yen. Yendu	Yenna	Yen	Nana	Yennuḍ. Yennuḍ
We	Yendu. Yennadu	Yennadu	Yennade	Nanuḍ	Navu
	Em. Am	Yengla	Yenge	Yenga	Yemmuḍu or Yem- muḍ, for both
Our	{ Yem. Yemdu }	Yenga	Emu	Yenda	Yemmuḍu or Yem- muḍ, for both
	{ Am. Amdu. }	Anga	Amu	Nama	Yemmuḍu or Yem- muḍ, for both
Ours	{ Yemdu. Yemmadu }	Yengadu	Emadu } Nangude Amdu }	{ Yengadu } Namuḍu	Yemmuḍu or Yem- muḍ, for both
	{ Amdu. Ammadu }	Angadu. Nammadu	Ni. Niye	Ni	Ni
Thou	Ni	Ni	Nin	Nina	Ninuḍ. Nina
Thy	Nin. Nindu	Ninna	Ninnade	Ninadu	Ninnuḍu
Thine	Nindu. Ninnadu	Ninnadu	Ninge	Ninga	Niv
Ye	Niv	Ningla	Nimude	Nima	Nimud
Your	Nim. Nimdu	Ninga	Nimadu. Ningude	Nimadu. Ningadu	Nimmuḍ. Ningadu
Yours	Nimdu. Nimmadu Ningadu	Ningadu			
He. She. It.	Avan. Aval. Adu	Ava. Avla. Adu	Avane. Avale. Ade	Avanu. Avalu. Adu	Ava. Avla. Adu
His	Avan	{ Avana }	Avana	Avana	Avanuḍ
Her	{ Aval }	{ Avala. Avla. }	Avale	Avale	Avaluḍ
Its	Adun	{ Aduna }	Aduna	Adara	Aduna
His	Avandu	{ Avanadu }	Avanade	Avanadu	Avanuḍu
Her's	{ Avaldu }	{ Avaladu }	Avalade	Avaladu	Avaluḍu
Its	Adundu	{ Adunada }	Adunade	Adaradu	Adunuḍu
They	Avan	Avara	Avare	Avaru	Aduru
Their	Avan. Avardu	Avakara	Avare	Avara	Avaruḍ
Their's	Avardu. Avaradu	Avakaradu	Avarede	Avaradu	Avaruḍu

Corrections by the Rev. B. SCHMID, in the "Malabar" words of the Cylonese Vocabularies.

ORIGINAL.

Akayam,
Irat-tham,
Pasú,

Kákam. Kakkei,
Naul.

Thenam, Malabar.
Dina, Singalese.

Talappen.
Thanthci. Thathei.

Poo.
Meen.
Dawasa Singalese.
Iratiri.

Natchetheram.

Koramam.

Ali'-thu.
Ningal.

CORRECTION.

Ágáyam. Ágáam : the y, merely intercalary.

Irattham. Rattam : the i servile, = Sanscrit rak tam.

Pasú. { Both syllables short : accent not = long vowel or syllable. It often falls on a short syllable.

Kákam. Kákei. { Kakkei, which is the English mode of lengthening the a by making the accent coincide with it, could not be understood.

Nál. Naul would be pronounced Nowl on the continent of Europe and would mislead. { These words, seemingly so different, are identical, the difference resulting merely from bad pronunciation and a bad spelling. Singalese (and Sanscrit) d is expressed in the Madras Presidency generally by th, but quite erroneously, and European foreigners might suppose this th = the English th, whereas in all the world only Todas and Danes have the English th. Even the Greek theta Θ is not quite the same. [I doubt the implied Arian etymology. Dina vel Thina = day and to-day, is thoroughly Turanian. B. H. H.]

Tagappen. [Hard h, = k vel g, throughout the Turanian area. B. H. H.]

Tandei. Tatoi. { [T = d, and aspiration neutral, are characteristically Turanian, and so also a hard nasal followed by t rather than by d.]

Pú. } [These are merely the Gilchristian and Jonesian representations of vowels. B. H. H.]

Mín. } [Theso are merely the Gilchristian and Jonesian representations of vowels. B. H. H.]

{ Dáása : = Canareso Diasa and Latin Dies [Query ? w, like y, is an intercalary consonant, used normally to separate vowels. B. H. H.]

Iratir.

{ Natchótiram = Sanscrit Nakshatra. The native word is ván mín = fishes of the sky for stars [In Newari the stars are called forest or jungle of the sky. B. H. H.]

{ Better Kramam. The separation of the coalescing consonants being a mere trick of Tamil [Such separation is nevertheless normally Dravidian. B. H. H.]

Koramam.

Adu [ali' is merely the abrupt accent separating the root a and the servile óu. B. H. H.]

Ningal [u for n is a misprint merely. B. H. H.]

ORIGINAL.

Averkal.
Avei.
Ennudevathu.
Ummadiathu.
Oné.

Enathu.
Umathu.

Inthu.
Pat-thu.
Sympathu.
Idat-thu.
Nettu.
Inga. Angei.
Engai.

Kélei.
Met-tha.
Ethukuka.
His. That.
Moshito.
Which. Jón.
Which. Tón.
Net-thirei.
Alukei.

H.
H.

∞ Iru.
K
Konduvá.
Eduttupódu.
Nadamaduthal.
Oduthal.

CORRECTION.

Avargal [gal = kal, plural sign. But gal is better a after liquid B. H. H.]

Avar [misprint merely. B. H. H.]

Ennudevádu. Enadu. { And so also read Avanudevádu and erase Avarudevádu which is
Ummudevádu. Umadu. { the plural.
Avarudevádu, just cited. In the neuter, avattin.

{ [I never use the diphthong ei so common in European writing of Dra-
virian tongues. With me é makes ai, and á, au, and ó, ou. I never
confound these two latter. The sliding French u I present in the
form of eu or in combination with a precedent consonant in the form
of yú, thus English *puling* and *tune* I write pyúling and tyún. The
French j and u as seen in *jeu d'esprit* are among the commonest and
most characteristic of Turanian sounds. I write them separately,
z and eu; united zyú B. H. H.]

Kulé. Long German dotted ü, or French ú.

Metta.

Edukkágu.

This. That.

Moustachio.

{ These are slips of the pen in the English column. The latter is inferred
from the Malabar terms.

{ The Hindi and Urdu relative and correlative are wholly unknown in Tamil. Whatever is
put down therefore must be incorrect.

Túngu.

Alu.

Ulukkáru.

{ Nitirei and Alukei (recte Alugei) are substantival forms, = *the sleep-
ing* and *the weeping*.
{ Iru means literally *Be*, but is often used for *Sit*. But ulukkáru is the
proper word for *sit down*.

{ These are compounds from the verbs *come* and *go* and mean *taking come* and *taking go*.

Nada.
Odu.

{ Thal suffix means *the doing*; maduthal in Canarese = *to do*. Nada
and Odu are quite enough for *walk* and *run*.

REMARKS.—I give the above as they reached me without entirely assenting to the value set on such precision by the venerable Author of these corrections, or always even approving the corrections; for the more ample and careful becomes our survey of the Turanian tongues, the more deep is the conviction that the largest commutability of consonants and vowels is normal in this family of tongues, that local varieties of utterance are not to be reduced to a quasi exotic standard, and that Akayam and Keramam, for instance, reflecting as they do the well known preference of Tamil for surds and its aversion to heaped consonants, may very reasonably be preferred to Agayam and Kramam. Mr. Schmid's conjecture that the English *th* is known only to the Todas is incorrect, for, the Burmese and Kúkis as well as some Himalayan and Sifanese tongues have the sound; and likewise the Todava proneness to blend the sounds of *s*, *z*, and the English *th*, and the latter also with *d*, like the Tamulians of the Eastern Coast. My Ceylonese papers were prepared for me by a gentleman who used the ordinary English way of representing oriental words. I myself always use the continental, but the other does not mislead me. The Nilgirian vocabularies are framed on the latter model. The cerebral letters are marked by a dot, thus *ṭ*, *ḍ*, *ḷ*; *ch* is to be pronounced as in English much, *ch* with the mark \succ above, as in gaelic loch; and in Toda *th* is always to be sounded the English way. B. H. H.

Entomological Papers—being descriptions of new Ceylon Coleoptera, with such observations on their habits as appear any way interesting.
—By JOHN NIETNER, Colombo, Ceylon.

(Continued from page 394.)

Trib. Lebiidæ.

Anchista. n. g. N.

Corpus depressum, ovatum. Mentum dente magno obtuso, lobis parum brevioribus, his extus rotundatis, apice acuminatis. Palpi robusti, maxillares art. ultimo magno ovato, apice obtuso, labiales art. ultimo valde securiformi. Ligula cornea apice obtuse acuminata, labri marginem anteriorem attingens. (Paraglossæ a me non dissectæ.) Labrum transversim quadratum. Mandibulæ simplices apice arcuatæ et acuminatæ. Antennæ robustæ art. 1^o mediocri, 2^o brevi, 3^o quarto paulo longiore, 4-10 subæqualibus, 11^o penultimo parum longiore. Thorax longitudine latior, angulis anticis rotundatis, medio obsolete angulatus, basi angustatus, angulis rectis. Elytra apice quadrate truncata. Pedes robusti tarsis art. 4^o profunde bilobo, unguibus fortitor pectinatis.

12. *Anchista modesta*. N.

A. brunneo-testacea, elytris (maculis 2 obsoletis subhumeralibus exceptis) obscurioribus abdomine piceo. Long. corp. 4 lin.

Caput fronte medio leviter uniimpressa. Thorax linea media longitudinali divisus. Elytra apicem versus parum dilatata, striato-punctata, ad stiam 2^m punctis 2 majoribus subapicalibus, cum thorace marginata.

Prope Colombo nocte ad lumen cepi.

The characteristics of this new genus are those of the g. *Calleida* (between which and *Cymindis* I place it) excepting the ligula which in this case is obtusely acuminate, the last joint of the maxill. palpi which is obtuse at the apex, and the thorax which is not as in *Calleida* longer than broad, but the reverse. From *Cymindis* it would differ principally in the deeply bilobed 4th tarsal joint, and in some other minor points, but it is difficult to say what the true characteristics of this genus (which appears from this reason to require a careful revision) are, if even Lacordaire uses the particle

"on" not less than five times in the diagnosis he gives of it in his g. d. Col. However, I feel justified in separating *Anchista* from *Cymindis* as well as from *Calleida*. The name "*Anchista*" has reference to the affinity of the insect to the two genera just mentioned, whilst the specific name "*Modesta*" refers to its inconspicuous colours. Amongst its peculiarities, weight ought to be laid upon the plumpness of the palpi, and in fact on all the other parts of the mouth and even the whole head, which was very striking to me.

Like many of my best *Carabidæ* I found this insect at night on the table, whither it had been attracted by the light. I may mention that the single specimen which came thus into my possession has an oblong shallow impression on either elytron, perhaps accidental, perhaps a peculiarity. The anterior tarsi are dilated and furnished with hairy brushes below, longest at the apex of the lobes of the 4th joint.

Trib. *Lebiidæ*.

Elliotia. n. g. *N*.

Corpus subconvexum, ovatum. Caput mediocre, oculis maximis. Mentum leviter transversim emarginatum, edentatum, lobis acuminatis. Ligula submembranacea apice truncata, paraglossis connatis marginem anteriorem parum superantibus, obtusis. Palpi elongati, art. ultimo elliptico, acuminato. Labrum magnum transversum, integrum, mandibulas fere obtegens. Mandibulæ validæ, edentatæ. Antennæ robustæ filiformes, humeros superantes, art. 1° mediocri, 2° brevi, 3° quinti prope longitudine, 4° præcedente brevior, 2-4 obconicis, 5-10 æqualibus, cylindricis, 11° præcedente tertia parte longiore, 4-11 pilosis. Thorax parvus, capite minor, transversus, longitudine duplo latior; antice leviter emarginatus, lateribus elevato-marginatus, ab apice ad medium lateribus rotundatus, medio fortiter angulatus, a medio ad basin valde abrupteque angustatus, basi truncatus, subtus cylindricus. Scutellum leviter excavatum. Elytra ovata, marginata, apice sat fortiter truncata. Pedes omnes subæquales, simplices, teuales, tarsis cylindricis art. 3-4 magis minusve trigonis, unguibus simplicibus. Prosteruum carinatum.

In honorem Dom. Hon. Walteri Elliotti (*Maderaspatani*), naturalistæ diligentissimi, meritissimi, uomen imposui.

13. *Elliotia pallipes*. N.

E. supra nigra-nitida, thorace scutelloque rufo-testaceis, labro elytrorumque limbo atque sutura brunneo-testaceis; subtus piceus, pectore rufo-testaceo, pedibus albidis, his geniculis oreque (palpis obscurioribus exceptis) testaceis. Long. corp. $2\frac{1}{4}$ lin.

Caput ad antennarum insertionem et inter oculos utrinque profunde impressum. Thorax basi rugosus, ante medium utrinque uniimpressus, linea media longitudinali divisus. Elytra punctato-striata, infra humeros leviter impressa.

In ripis lacus Colombensis sub veget. putrescent. mens. Jul. non infrequenter legi. Agilis est et avolare semper expeditus.

A pretty and very interesting little insect, about whose systematic position I am not quite satisfied; however I provisionally place it towards the end of the true Lebiidæ. I find it most to agree with the descriptions of the g. *Pentagonica* S. G. and *Rhombodera* R. with neither of which, however, it is identical. The head is distinguished by the large and prominent eyes and 4 deep impressions, 2 larger ones at the root of the antennæ, 2 smaller ones between the eyes, also by a very distinct neck which connects it with the thorax; the labrum is large, transverse and entire, with the angles rounded off and the base narrowed; the mentum is but slightly transversely emarginated, edentate; the ligula is truncated at the tip, the paraglossæ adhere to it, reach a little beyond it and are obtuse at the apex; the palpi are rather long with the last joint elliptic, acuminate; the antennæ are strong, filiform and reach beyond the shoulders, joints 5-10 are of equal length and cylindric, 4-11 are pilose. The most remarkable part of the insect is, however, the thorax which is of a subrhomboidal shape, transverse, smaller than the head, as broad again as long, it has 2 strong lateral angles at the middle, each furnished with a strong bristle, the anterior part has the sides rounded, the posterior abruptly obliquely contracted, at the base it is cylindric. As a specific distinction of the thorax I mention moreover that in the present species it is impressed with 2 deep punctures before the middle and that it is rugose at the base. The abdomen is slightly peduncled. The scutellum is slightly excavated. The elytra are oval, rather convex and impressed with rows of punctures. The legs are simple and weak, apparently equal in both sexes. The

anterior tarsi are a little stouter than the rest, but not dilated nor furnished with any additional clothing below, the anterior tibiae are deeply notched. As to the colour: the head and wing-covers are black, the latter with the suture and margin of a light brown and highly polished, the thorax is reddish and the legs are whitish. The insect is very agile and ever ready to take to its wings. It is of quite a peculiar appearance, imparted to it by its large eyes, small curiously shaped thorax and rather plump elytra and abdomen. I may further mention that I have observed the 4th joint of the maxillary palpi to collapse when the specimens become quite dry, so as to give them a different, spool-like, appearance, apt to mislead any one who has not examined fresh specimens.

14. *Harpalus advolans*. N.

H. æneus, clypeo, labro, antennis mandibulisque brunneis, his apice nigris, subtus testaceus, lateribus obscurior, pedibus flavis, tarsis geniculis spiniulisque brunneis, ore testaceo. Long. corp. $4\frac{3}{4}$ — $5\frac{1}{4}$ lin.

Caput læve. Mandibulæ unidentatæ. Palpi art. ultimo elongato, apice truncato. Menti deus simplex, obtusus. Ligula apice quadrate truncata, angulis acutis leviter productis, paraglossis inflatis marginem anticum parum superantibus. Thorax longitudine sesquialter, dorso anticeque lævis, basi rugoso-punctatus, 2-impressus. Elytra striata, cum thorace anguste marginata. Variat colore testaceo-ænea.

Nocte ad lumen, sed ad huc non usquam alibi, non infrequenter cepi.

I have taken this species frequently at night on my table, but never found it as yet anywhere else. It is not very distinguished, for which reason I have mentioned the parts of the mouth in the description, these being moreover not very constant in this genus. The insect is of the usual oval Harpalus-form, of a dark metallic green on the back and more or less yellowish or light brown below, the colour of the back changing occasionally to a brownish green.

15. *Oodes piceus*. N.

O. ovatus, subconvexus, piceus, tarsi, palpis antennarumque articulis 3 primis castaneis, palpis apice flavis. Long. corp. 4 lin.

Caput parvum, inter antennis linea latitudinali abbreviata impressum. Labrum integrum, punctis 3-impressum, puncto intermedio bi-, lateralibus uni-setigeribus. Mandibulæ validæ prominentes. Palpi art. ultimo elongato-ovato, apice leviter truncato. Menti dens apice truncatus leviterque sinuatus. Antennæ art. 3^o quarto æquali nisi paulo brevior. Thorax amplus basi elytris applicatus, apicem versus angustatus, angulis posterioribus subdepressis translucens, ante scutellum leviter sinuosus, ante sinum obsolete latitudinaliter impressus. Elytra striata, cum thorace angustissime marginata. Pedes validæ, ant. tibiis apice intus uni—, intermed. et post. bi-calcaratis.

Specimen singulum f. in ripis lacus Colombensis sub vegetab. putrescent. legi.

As already one species with a bifid mentum tooth (*O. pulcher*) has been received into this genus, I have waved the hesitation I should otherwise have felt in referring to it the present one, the tooth of which is of a similar description. I have not seen the *O. pulcher*, but as it is said to be an inhabitant of this part of the world it may possibly be identical with my species. If not, they might, as the g. is otherwise pretty constant in its characteristics, be separated under a new name as types peculiar to India. Besides the abnormal mentum tooth the insect has not much to distinguish it from others of the genus. The labrum is, however, peculiar, being entire, or even very slightly produced in the middle, with the angles rounded off; it is impressed near the anterior margin, with 3 deep punctures, the central one of which is furnished with 2, the lateral ones with one strong bristle each. The anterior tibiæ are but slightly notched. The prosternum is largely developed, reaching beyond the anterior coxæ, obtusely acuminate, and received in a deep excavation of the mesothorax. But I doubt whether the development is sufficiently large to entitle the insect to a place in the g. *Lonchosternus* Laf. which, however, I have not seen in nature.

16. *Trichopteryx cursitans*. N.

T. ovata, subconvexa, pubescens, supra obscure ænea, elytris æneo—brunneis, subtus picea, pedibus oreque testaceis, antennis art. 3-11 nigrescentibus. Long. corp. $\frac{2}{3}$ lin.

Antennarum clava art. 2 primis ovatis, ultimo conico, acuminato.

Thorax amplissimus, elytris tertia parte minor, convexus, angulis acutis, basi humeros amplexens, apice angustatus. Elytra subdepressa, subquadrata, apicem versus parum angustata, truncata, abdominis 3-4 segmenta ultima non obtegentia. Tibiæ medio incrassatæ. Coxæ posticæ maxime dilatatæ. Mesosternum carinatum.

Sub veget. putrescent. exsicciscentibus in prov. occid. copiosa.

A rather large species commonly met with in this part of the Island under rotting vegetable substances somewhat dried up. It is very agile and ready to take to its wings, which are of the beautiful typical construction, about twice the length of the body and in dead specimens frequently produced behind. These insects vary a little as to shape, some being more narrowed behind than others, and also as to the exact number of the abdominal segments left uncovered by the elytra. The head is large but exhibits nothing abnormal or extraordinary; the thorax is very large, emarginated in front and behind, with the angles acute, the basal ones enveloping the shoulders; the wing covers are subquadratic with the angles rounded off and a little narrowed behind; the legs have the tibiæ incrassated in the middle and the posterior coxæ very much dilated and distant from each other, in all other respects they are typical. The shape of the body is that of an egg, broadest at the shoulders, gently narrowed towards the apex of the abdomen, and rounded off towards the head.

17. *Trichopteryx immatura*. N.

T. præcedenti similis, differt tamen colore supra æneo-testacea, subtus testacea, antennarum art. 3-11 nigrescentibus; differt etiam corpore crassiore, magis quadrato, capite paulo majore, thorace minus convexo, parum ampliore, elytris abdomen totum vel fere totum obtegentibus. Pedes, antennæ etc. omnino præcedentis. Long. corp. $\frac{1}{3}$ lin.

In præcedentis societate specimina nonnulla legi.

Of somewhat the appearance of an immature individual of the former but sufficiently distinct to be formed into a new species. The insect is altogether of a different appearance, imparted to it by the greater general plumpness of the body, the larger head, the less convex but at the same time possibly still ampler thorax, the altogether more

quadratic shape, etc. The remark regarding the exact number of abdominal segments left uncovered by the elytra, applies to this and all other species as well. The present one has geuerally the last 2 segments uncovered.

18. *Trichopteryx invisibilis*. N.

T. ovata, subdepressa, subparallela, pilosa, supra obscure ænea. subtus picea, pedibus, abdomine, autennis oreque testaceis. Long. corp. vix $\frac{1}{5}$ lin.

Thorax amplus, elytris sesqui miuor, convexus, angulis posticis humeros vix superantibus. Elytra oblonge quadrata angulis rotundatis, subdepressa, truncata, abdomen totum vel fere totum obtinentia. Coxæ posticæ approximatae. Tarsi typicis minus elongati, art. 3^o præcedentibus haud multo longiore.

Cum *T. cursitante* victitat ; frequenter legi.

A very pretty and very distinguished species. Its most striking peculiarity consists in the posterior coxæ which are as little distant from each other as those of the anterior legs, and almost touch each other, and also in the shortness of the tarsi. The head with the antennæ, the mesosternum, the tibiæ, which are incrassated in the middle, and the posterior coxæ with regard to their enlargement, are quite typical. However, the thorax and elytra differ again from those of *T. cursitans* (which in every respect may be looked upon as the typical representative of the family in Ceylon and which is here referred to as such) the former by the shortness of the posterior angles which can hardly be said to envelop the shoulders, the elytra by being less or not at all narrowed behind, giving an oblong rather than an oval shape to the insect. Although in length only about one half shorter, it is in bulk certainly one-fourth smaller than *T. cursitans*, and although probably the smallest Ceylon beetle, it is distinguished at first sight.

19. *Ptilium subquadratum*. N.

P. subquadratum, subconvexum, pilosum, obscure æneotestaceum, thorace dilutiore. Long. corp. $\frac{1}{4}$ lin.

Caput mediocre. Antennarum clava art. 1^o inverte conico, 2^o subcylindrico, ultimo elongato-ovato. Thorax convexus, angulis

basalibus humeros fortissime amplexantibus, apicem versus valde rotundatus, apice leviter sinuatus. Elytra quadrata, abdomen non totum obtegentia. Scutellum parvum. Pedes robusti tibiis apicem versus incrassatis, tarsis art 3^o primi secundique longitudine, his subbilobis subtus penicillatis, coxis posticis simplicibus distantibus. Mesosternum non carinatum.

Ubi præcedentes sed infrequenter occurrit.

The g. *Ptilium* is the repository for all the anomalies of the family, its characteristics therefore are very vague, but if the absence of the mesosternal carina and the simplicity of the posterior coxæ are the determining features amongst them, the present species, in spite of a variety of anomalies it exhibits in other respects, belongs to it. The head is of middling size; the antennæ robust with the 1st joint of the club of the shape of an inverted cone, the 2nd rather cylindrical, narrowed at the base and the last elongate, ovate. The thorax is of very different structure from that of the foregoing species of the family the basal angles being produced unusually far beyond the shoulders; towards the head it is strongly and rapidly rounded off, being thus altogether of a semicircular shape; at the apex it is merely slightly sinuated, and the head is inserted rather below than in this sinuosity; the whole thorax moreover is very convex whilst the elytra are depressed. The wings vary from the typical form by being fringed with short simple cilia instead of those long feathery appendages, they are moreover without a distinct peduncle, but still folded in the manner characteristic of the family. The legs are stout, with the tibiæ thickest at the tip; the 3rd tarsal joint is of the length of the preceding two, the latter are somewhat bilobed and hairy below. The posterior coxæ are simple and distant. The mesosternum without a carina. The whole shape of the insect is quadratic rather than otherwise.

20. *Ptenidium macrocephalum*. N.

P. ellipticum, subconvexum, nitidum, sparsim pilosum, supra piceo-æneum, subtus piceum pedibus oreque testaceis. Long. corp. $\frac{3}{4}$ lin.

Caput maximum. Antennarum clava elongata articulis ellipti-

cis. Thorax subquadratus antice posticeque angustatus, basi punctis 4 magnis profunde impressus. Elytra ovata, medium versus leviter inflata, apice obtuse acuminata, abdomine longiora et ampliora, punctulis lineis dispositis aboletissime impressa. Alæ corpore plus duplo longiores. Tibiæ fortiores spinulosæ. Tarsi breviores. Prosternum carinatum.

In præcedentium societate frequenter lectum.

This is perhaps the prettiest of the 5 species of the family just described and at first sight recognised by the shape of its body and the polished back. The head is very large. The thorax is narrowed in front and behind, at the latter place impressed with 4 deep, not to be overlooked, punctures. The wing-covers are oval, a little inflated about the middle, rounded at the apex, and longer and wider than the abdomen. The prosternum is carinated.

It affords me much gratification to be enabled to publish representatives of 3 genera of this highly interesting and probably very extensive and widely distributed family of pigmies, the Asiatic representatives of which have hitherto been entirely unknown. I have no doubt that even this Island is the abode of a great many more species.

21. *Stenus barbatus*. N.

S. elongatus, æneo-niger, nitidus, punctatus, sparsim pubescens, pedibus palisque albidis, ore coxisque testaceis, antennis brunnescentibus. Long. corp. $2\frac{1}{2}$ lin.

Caput thorace tertia parte latius, fronte costis 3 abbreviatis, antice albido-pubescens. Antennæ art. 3^o sequentium 2 fere longitudine, 3 ultimis elongatis, ellipticis. Palpi max. elongati apice densius pubescentes. Thorax cylindricus medio leviter incrassatus, basi subquadratus. Elytra thorace paulo longiora, sed fere duplo latiora, convexa, ovata. Abdomen immarginatum. Pedes elongati tenues, tibiis apice tarsisque fortiter setosis, his art. 4^o profunde bilobo.

In lacus Colomb. ripis specimina nonnulla legi.

This, as well as the following species, belongs to Erichson's division II. B. of the g., both having the abdomen immarginate and the 4th tarsal joint bilobed. Everything about this species is

elongated. The head is about one third broader than the thorax; the forehead is slightly excavated with two elevated ridges running from the root of the antennæ a short distance upwards; a third runs from the crown of the head down towards the centre of the two former, but all three reach only about the middle of the head. The part below the antennæ is covered with white hair. The antennæ have the 3rd joint much elongated and the terminal club composed of elliptic joints. The thorax is rather slender, incrassated at the middle, gradually narrowed in front, but nearly quadratic behind. The elytra are longer than the thorax, about double its breadth, and oval, being slightly narrowed at the shoulders and the apex. The legs are long and slender, hairy at the apex of the tibiæ and the tarsi, the latter very much so on the inner side. The insect is of a metallic black colour highly polished; the legs, palpi and the first 2 antennal joints are whitish, the tibiæ and the apex of the palpi being, however, rather darker; joints 3-11 of the antennæ are brownish; the coxæ and the mouth are yellowish; the tarsi have a brown spot at the apex of the first 3 joints; the claws are black. The insect is punctured all over, but less so on the abdomen, the apical segments of which are indeed nearly smooth, than elsewhere, and sparingly covered with small white hairs.

22. *Stenus lacertoides*. N.

S. robustus, nigro-æneus, dense profundeque punctatus, subtus sparsissime pubescens, pedibus palpisque testaceis, femoribus apice nigrescentibus, antennis oreque castaneis. Long. corp. $1\frac{1}{2}$ lin.

Caput thorace quarta parte latius, fronte 2 costata. Antennæ robustæ art. 3^o quarto paulo longiore, 9-10 globosis, 11^o conico. Thorax cylindricus, medio fortius incrassatus, latitudine quarta parte longior, margine anteriore elevato, basi subquadratus. Elytra thorace longiora, convexa, humeris prominentibus. Abdomen immarginatum. Tarsi art. 4^o profunde bilobo.

In prov. occid. stagnorum ripis rarius occurrit.

About this species every thing is robust. It is well distinguished by the rounded club-joints of the antennæ, the elevated anterior margin of the thorax, the prominent shoulders, and its general shortness and plumpness. The forehead is rather more depressed or

excavated than in the former, the two antennal ridges are shorter, the vertical one is altogether obsolete. The palpi are robust. The 3rd antennal joint is about one third longer than the 4th. The thorax is shorter and plumper than in the former. The elytra are less oval, having the shoulders more prominent and only the apex rounded off or narrowed. The legs are similar to those of the former, but more robust, less hairy and have the tarsi more cylindric. The insect is of a blackish metallic colour; the legs and palpi are yellowish; the tibiæ, however, the apex of the palpi, and also joints 1-2 of the antennæ are rather darker; the femora are blackish towards the end; the mouth and joints 3-11 of the antennæ are chestnut and the coxæ pitch-colour. The animal is densely and deeply punctured all over, very sparingly covered with small greyish hairs, nearly obsolete on the back but more distinct below. It is less highly polished than the former. I have known this species for a long time, and specimens of it must exist at the Mus. Berol.; the former I met with but lately.

I may mention that in dissecting these two species I have observed the same remarkable production of the œsophagus with the ligula, characteristic of the g. and noticed in many of the European kinds.

23. *Anthicus formicarius*. N.

A. castaneus, capite, abdomine elytrisque piceis, his pilorum niveorum fascia media transversali interrupta maculisque concoloribus 6 humeralibus, obsoletis, parce pilosus. Long. corp. $1\frac{2}{3}$ lin.

Caput globosum supra subtusque profunde punctatum, oculis parvis. Thorax nodoso-pyriformis, infra medium constrictus, parte anteriore crassiore lin. long. med. profunde divisa, subcordiformi. Elytra elliptica.

Sub veget. putrescent. victitat; prope Colombo rarius legi.

This insect looks uncommonly like an ant. It is easily distinguished from all other species of the Island partly by this resemblance, partly by the sculpture of the thorax and the white fascia across the elytra. The antennæ are robust, thickened towards the tip, the 3 last joints forming a club. The legs have the femora very much incrassated, the tibiæ at the apex bicalcarate and the tarsi,

especially of the anterior pair, very hairy below; the 4th joint appears to be slightly cordiform. The white marks of the shoulders and the fascia across the wing-covers are composed of white hairs, the former are rather an interrupted row of these than true maculæ, the fascia consists of two halves, one in either elytron, reaching neither the external margin nor the suture. The insect is of slow motion.

24. *Anthicus insulanus*. N.

A. testaceus, abdomine obscuriore, capite thoraceque rufotaceis, elytris fasciis 2 nigris, parce pilosus. Long. corp. $1\frac{1}{4}$ - $1\frac{1}{2}$ lin.

Caput globosum oculis mediocris. Thorax pyriformis, cum capite supra punctata. Elytra ovata. Tarsi art. 4° bilobo.

Prope Negombo in pratis sat copiosus.

In some of the specimens before me the anterior femora are furnished with a strong thorn inside, having at the same time the tibiæ of the same pair of legs slightly emarginated inside near the apex—I have reason to believe these individuals, if the distinction be a sexual one, to be females not males.

25. *Meligethes orientalis*. N.

M. ovatus, subconvexus, pilosus, supra nigro-æneus, subtus piceus, pedibus, antennis palpisque maxill. dilutioribus, tarsis palpisque labial. brunneo-aureis. Long. corp. 1 - $1\frac{1}{2}$ lin.

Mentum transversum planum, punctatum, lobis apice depressis excavatis, glabris, obtusis. Palpi lab. art. ultimo inflato, ovato; maxill. art. ultimo apice angustato levissime truncato. Mandibulæ unidentatæ. Thorax amplus angulis acutis, antice emarginatus, postice pluries sinuatus, subtus punctatus. Elytra ovato-quadrata, angulis 4 apicalibus rotundatis, pygidium laud obtegentia. Pedes validæ, femoribus tibiisque incrassatis; anteriores tibiis apice intus unispinosi, tarsi art. 1-3 fortiter dilatatis, 1-2 subæqualibus transversis, profunde reniformibus, 3° minore, cordato, 4° minimo, subcylindrico; intermed. et post. tibiis extus spinulosis, tarsi anterioribus similibus sed art. 1-3 minus dilatatis, cordiformibus. Prosternum marginatum, punctatum, obtuse acuminatum. Mesosternum antice carinatum.

Variat magnitudine et colore æneo-brunnea.

Prope Colombo in floribus per occasionem frequentissime legi.

Of the usual shape and colour, but larger than usual, varying, however, in this respect, some individuals being fully one third smaller than others. These small individuals, which occur in the proportion of about 1 to 20, are moreover nearly always of a brownish metal colour instead of a blackish green. I have been unable to discover any other distinctions. I was much interested by the discovery of these insects, having missed them for years amongst the abundantly represented *Nitidulidæ* of the Island. They appear of local occurrence or attached to certain plants, which is nearly the same. I find them in abundance in the beautiful bellshaped blossoms of the *Argyrera argentea* and one or two other plants in my garden. The species appears to differ from the typical *Meligethes* in the following points: the structure of the mentum, which I have sufficiently described above, the last joint of the lab. palpi which in this case is not truncated, and the first of the antennæ which is externally incrassated as in *Epuræa*. The antennæ are otherwise robust, the club is firm and hairy. The thorax is very ample, thinly ciliated along the upper part of the interior margin, rather strongly below. The prosternum is largely developed, marginated, punctured and obtusely acuminate, overlapping the anterior part of the mesosternum which (the anterior part) is cylindric and carinated. Joints 1-3 of the tarsi are strongly penicillated below, the penicilla being composed of glanduliferous hairs of a fine golden colour.

26. *Georyssus gemma*. N.

G. pygmæi statura et magnitudine, supra purpureo-æneus, iridescens, subtus piceus; *alatus*. Thorax subsemior bicularis infra apicem constrictus, sulco med. long. divisus, lateribus, basi apiceque excavatus, impressionibus 3 majoribus dorsalibus, 2 minoribus lateralibus. Elytra fortissime costata, costis obtuse dentatis, in interstitiis transversim punctato-impressa, ad humeros profunde excavata, infra medium leviter sinuata. Tibiæ extus spinulosæ, intus sparsim ciliatæ.

In prov. central. montibus Kotmaliensibus alt. 3500 ped. in rivulorum ripis non infrequenter legi.

Lacordaire and others characterize the g. *Georyssus* as having the elytra soldered together and being destitute of wings. *In the present species, however, the elytra are unconnected and cover wings proportionately larger than in any other beetle I can at present think of.* They are elongated and comparatively narrow, resembling in shape very much those of a *Libellula*, have a few veins at the base, and are ciliated at the margin. I have moreover occasionally taken insects of this g. *flying* about the light at night, but I am not quite sure at present whether it was this or any other species. The sculpture of the thorax is complicated and difficult to describe, however, the leading features in it are these : a subapical sinuosity on either side ; a longitudinal furrow ; excavated sides, base and apex ; 3 larger dorsal depressions (1 central, 2 obliquely basal) and 2 smaller lateral ones at the subapical sinuosities—a short elevated ridge at the centre of the base separating the 2 basal impressions and being itself divided by the longitudinal furrow ; 2 elevations separating the anterior part of the basal impressions from that of the central one (at the middle these 3 depressions are connected) ; 2 small rugosities near the anterior margin, one on either side of the longitudinal furrow.

The sculpture of the elytra is less complicated : they have a deep cavity at the shoulder, a large, but not deep sinuosity below the middle, and are obtusely acuminated. The costæ of the back are 11 in number, the suture lying in the central one. The half of this central costæ and the exterior margin form an elevated border round either elytron. The first and second on either side run towards the apex but come to a stop (very abrupt in most, but less so in some, specimens) before reaching it ; the third, after having been interrupted near its base by the subhumeral cavity, runs on, but does not reach as far as the former ; the 4th does not leave the region of the shoulder ; the last on either side is very prominent at the base but soon forms an abrupt declivity and runs on as a low ridge to below the middle. The back of all these costæ is obtusely dentated. The interstices are marked with large, shallow, transverse impressions. The head of the insect is rather large and even. The mandibles are furnished with an obtuse subapical tooth, the two lower thirds are ciliated. The maxillæ have the apex of the outer lobe externally

enlarged, rounded off and furnished with 3 strong teeth replaced by cilia on the inside, the inner lobe is conic and similarly provided with teeth and cilia, but much thinner and finer. The maxillary palpi are robust, the last joint is inflated at the base. The antennal club is hairy, dark (whilst the remaining joints are yellowish), conic and somewhat securiform, the 6th joint being inserted on one side of the 7th. The legs are robust, the tibiæ slightly curved, obliquely truncated at the end, furnished with spines along the outside and with distant cilia along the inner.

27. *Hydrochus lacustris*. N.

H. elongatus, subdepressus, supra metallicus, iridescent, subtus piceus, pedibus, antennis, palpis elytrorumque margine magis minusve brunneis, mento cyaneo. Long. corp. m. 1 lin., f. multo major atque robustior.

Palpi. maxill. robusti art. ultimo elliptico leviter inflato. Mandibulæ apice bifidæ. Antennarum clava dense pilosa. Thorax oblonge quadratus basin versus angustatus basi medio productus, cum capite profunde punctatus. Elytra ad humeros oblique truncata, apicem versus sat fortiter angustata, profunde striato-punctata. Tibiæ extus spinulosæ.

Specimina nonnulla in lacu Colomb. legi.

The head is robust, broader than the thorax, the eyes large and prominent.

The femora, the last joint of the maxill. palpi, the mandibles and the tarsal joints are dark towards the apex. The last abdominal segment of the f. is furnished with a bifid hairy appendage.

28. *Hydrous rufiventris*. N.

H. ovatus, convexus supra oleagino-niger, subtus obscure ferrugineus, pedibus dilute piceis, labro æneo, reliquis oris partibus cum clypeo testaceis. Long. corp. g. lin.

Palpi maxill. articulis apicem versus abruptius incrassatis, art. 3^o quarto sesqui longiore. Antennæ art. 7-8 fortiter perfoliatis, ultimo acuminato. Caput antice utrinque punctulorum serie subsemicirculari et ad oculorum marginem anteriorem impressum. Thorax punctulorum seriebus 4 lateralibus, 2 subapicalibus obliquis

abbreviatis signatus. Elytra subliliter striato punctata. Tarsi omnes unguibus basi fortiter unidentatis. Carina prosternalis cultriformis.

Specimen singulum f. nocte ad lumen cepi.

As far as my resources allow me to ascertain, a very anomalous species, having the perfoliated antennæ and toothed claws of a *Hydrophilus* and the cultriform prosternal carina and the elytra of a *Hydrous*. I have placed it in the latter g. on account of the sharp edge of the prosternal carina, in which the great distinguishing character of this g. seems to lie, the same being deeply grooved in *Hydrophilus*.

The insect at once attracts attention by the reddish colour of its abdomen. It is of a blackish olive colour on the back, having, however, the clypeus and the anterior margin of the labrum of a yellowish brown, the latter being otherwise of rather a metallic colour. The remaining parts of the mouth are more or less yellowish. Joints 1-6 of the antennæ are yellowish too, with the exception of the 2nd which is dark; joints 7-9 are blackish and pubescent. The legs are of a light pitch colour. The lower part of the head is impressed with 2 rather semicircular series of punctures, similar punctures occurring along the internal margin of the eyes. The thorax is marked with 6 series of them and on the elytra they are arranged in lines. The sternal carina is well developed, the prosternal part has a sharp edge, whilst the mesosternal one is obtuse on the back and the metasternal part depressed and slightly grooved.

29. *Hydrous inconspicuus*. N.

H. præcedente minus convexus, supra oleagino-niger, subtus rufo-piceus, ore testaceo. Long. corp. $4\frac{1}{2}$ lin.

Palpi maxill. art. 2° et 4° subcylindricis, 3° apicem versus sensim incrassato, sequente tertia parte longiore. Antennæ art. 7-8 subglobosis, 9° magno, ovato. Caput, thorax et elytra ut in præcedente sculpta et signata.

In lacu Colomb. mens. Jun. non infrequenter cepi.

This is in every respect a normal species. The prosternal carina has a sharp edge, the claws are simple, the antennal club is com-

posed of rounded joints, the elytra are of the typical structure, etc. In the latter respect, as well as with regard to the various series of punctures upon head, thorax, and elytra it resembles the former; the punctures of the elytra are, however, less distinct. Joints 1-6 of the antennæ are yellowish, the club being dark and finely pubescent. The maxill. palpi have joints 2 and 4 subcylindric, but the intermediate one thickened towards the tip.

I have frequently in the month of June taken the pupæ of this species on the banks of the Colombo lake and hatched them at home. I found them about one inch under ground, and often as far as 12 feet from the edge of the water, but still in muddy places. The imago is very active, perhaps more so than any other species of the g.

General Remarks on certain Scydmæni described below.

In the first number of these papers I have described a winged species of *Ædichirus*, a g. supposed to be without organs of flight; and above I have given publicity to the more important discovery of wings in the single g. which forms the family of the *Georyssi*, also hitherto supposed to be apterous; I am now about to announce to some and confirm to others the existence of these organs in the family of the *Scydmænidæ*, a fact, although incomplete, of more importance than either of the former, considering the extent of the family and the difference of opinion which appears to exist on the subject amongst the most eminent entomological authorities. It is this importance which induces me to enter more fully on the subject.

I am not acquainted with the famous monograph of the family of the *Scydmænidæ* by Dr. Schaum; however, from the manner in which it is quoted by Lacordaire in his g. d. Col. I should infer that these two celebrated authors agree in all the vital points. In Lacordaire's diagnosis of the family these insects are described as having (with the exception of the American g. *Brathinus*, of which Lacordaire is not quite sure that it belongs to the family) the elytra soldered together and being destitute of wings. Now, it is scarcely credible that on a point so easily ascertained as this any difference

of opinion should exist, still Westwood in his Modern Classification of Insects in describing the same family makes statements which imply the contrary. However, Lacordaire's description, being by 15 years more recent and in fact the latest, is from this reason alone entitled to be considered before all others, and looking upon it in this light, that is as the essence of all former observations, I shall for the present occupy myself with it alone. According to this description, as mentioned above, the insects which it regards *have the elytra soldered together and are destitute of wings*. This being the case, I was startled to find that out of the 13 species described below, 9 or 10 which I examined in this respect, had neither the elytra soldered nor were they destitute of wings—*on the contrary the elytra were unconnected in the middle and the wings were nearly double the size of the whole insect and could not possibly be overlooked*. I would willingly suppose that the 100 species of this family contained in European collections, and principally derived from Europe and N. America, agreed with Lacordaire's description and that the Ceylon species were exceptions to the general rule, had not Westwood's observation alluded to above corroborated my own, thus rendering me suspicious of some unaccountable mistake or oversight somewhere or other. That this mistake can not consist in a slip of the pen or a misprint in the g. des Coléoptères quoted above, is clear from the obvious care which has in every respect been bestowed upon this work, and from the same remarks being repeated in different words. Where this mistake is, and upon what grounds it rests—it would, under my circumstances, be useless to attempt to unravel. However, it appears certain to me that some more detailed and positive remarks on the subject can not be superfluous, and must be new to some Entomologists. Placing the fullest confidence, as every one would do without hesitation, in the infallibility of the description of the Belgian author, it was not likely that I should have looked for wings at all in the Scydmanidae (a family to which I have not until lately paid much attention) had I not been struck by seeing the elytra of my *S. alatus* open when handling it with a fine painter's brush in a drop of water, it being at the time quite out of the question that the opening could have been effected by pressure. On opening the elytra fully I had no difficulty in discovering the wings. Ren-

dered extremely curious by this discovery—diametrically opposed to the distinct statement of so great an authority as the one just alluded to—I now examined other species, and all with the same result, most of them opening the elytra without my assistance in the same manner as the *S. alatus*, and I have not the slightest doubt that when a sufficient number of specimens enable me to examine the rest it will still be with the same result. That these insects use their organs of flight may be gathered from the following: At a former period I lived in a house situated on a small eminence and overlooking extensive groves of Cocoanut trees, Cinnamon gardens, Paddy fields and patches of jungle. Here I collected large numbers of Pselaphidæ, especially *Euplectus*, in thin, scarcely visible spider webs with which the white walls of the house were covered in certain places—thus forming one large trap for anything small flying about. That these had been caught here when on the wing there could be no doubt, but I was much surprised to find with them (what is so common in more congenial localities, here also) a considerable number of Scydmanæi, especially my *S. advolans* and *pubescens*, as they were said by the most recent authority to be unable to fly, and the position they then found themselves in was one they could not well, or could not possibly, have got into otherwise than by flying. From some reason or other, I am ashamed to say, I did not follow up the matter at the time, but I am now certain on the subject, indeed to remove all doubt and to settle all disputes I have just been so fortunate as to take my *S. advolans* actually on the wing, flying in my garden in the evening at sunset.

Having gone so far, I will (in spite of some slight misgivings of being laughed at for telling an old story with so grave a face) add a few descriptive words about the organs in question: The wings of my Scydmanæi are ample, about double the size of the whole insect, oblong, having the margin beautifully ciliated and, with the exception of a few yellowish veins at the base, without any visible organs of this kind.

In spite of the difference in their shape, etc. I believe the species described below all to be genuine Scydmanæi as restricted at present. Being, however, unacquainted with the sexual distinctions of these insects (which indeed I believe not to have been satisfactorily

pointed out by any one, and to differ in different species) I should not be surprised if one or two of my species were eventually ascertained to have been separated upon these grounds alone. However, as I have been very reluctant to admit of new species, it is just as likely that individuals may hereafter be found united in one, which ought to be separated into two species. But I trust that neither may happen. The species were all collected by myself in the immediate neighbourhood of Colombo, I have, however, no doubt that they occur all over the S. W. of the Island, which is of a uniform physical character, and perhaps occupy a still larger portion of it. None of them are quite common, on the contrary of nearly half of them I possess only 1 or 2 specimens. My *S. femoralis* I found under the soft, rotting bark of an *Erythrina indica*, *S. Ceylanicus* and *ovatus* I found dead in spider-webs; *S. graminicola*, *glanduliferus* and *pyriformis*, I have hitherto exclusively taken in the sweeping net on the lawns of my garden about sunset; the other species I have met with indiscriminately in spider-webs, under rotting vegetable substances and in the grass.

After this preamble, which I trust may not be deemed quite superfluous, I now enter upon the description of my species, drawing attention previously to the three very natural and very distinct groups which they form, the characteristics of which will at once be perceptible from the headings given below. With regard to the first group (A. I. spec. 30-34) I may mention that the elongated legs, largely developed posterior trochanters and often distant posterior coxæ render the motions of the insects belonging to it staggering when walking, which together with their oblong, sub-depressed body distinguishes them at a glance. I have subdivided them from the cultriform or grooved mesosternal carina. The second group (A. II. spec. 35-41) is equally well characterized as the former by the more robust, pyriform and subconvex body of the insects. *S. pselaphoides* in the former and *S. advolans* in the present group form connecting links between the two, especially *S. pselaphoides*, which in general appearance rather belongs to the second; upon closer examination, however, it is easily ascertained to be an anomalous member of the former. From the rounded or narrowed occiput I have divided the second group into two subdivisions giving

preference to the distinctions to be drawn from this part of the body to those to be derived from the thorax, which from the variety of shapes it assumes would naturally suggest itself for that purpose, but the gradations between the principal forms appear to me too many, too fine, and therefore too indistinct, to adopt them. As to the third group (B. spec. 42) the insect which alone forms it amongst those described below, is so different from any of the others that its peculiarities must strike any one at first sight.

A. Species with a thick neck, abruptly formed and immersed in the thorax.

I. Fourth joint of the maxill. palpi not acuminate; head subquadrato-ovate; eyes middling or small, finely granulated, little or not at all prominent; antennæ subapproximate at the base; posterior trochanters elongated at the apex; thorax obovate; body elongate, subdepressed.

a.) Mesosternal carina slight, simple.

30. *Scydmaenus alatus*. *N.*

S. dilute brunneus, pedibus antennisque dilutioribus, tarsis palpisque testaceis; pubescens; long. corp. $\frac{2}{3}$ lin.

Antennæ art. 1^o apice biacuminato, 3-4 subæqualibus, 5 præcedente majore, 6 longitudine inter 4 et 5, ovato, 7-8 subæqualibus, 9 majore, 7-9 apice angustatis, tubiformibus, 10-11 ovatis, clavam formantibus, *vel* art. 9 globoso, 9-11 clavam formantibus. Palpi maxill. art. ultimo minimo, apice truncato. Mandibulæ dente bifido munitæ, basi fortiter abrupteque dilatatæ. Thorax foveis basalibus nullis. Pedes elongati tarsis art. 2-3 subæqualibus.

I include in this species individuals with a 2- and others with a 3-jointed antennal club. The latter are further distinguished by having a slight sinuosity in the rounded outline of the basal angles of the thorax, by having the posterior part of the metathorax and the base of the abdomen sensibly incrassated, and the head rather less quadratic than the former. However, the individuals thus distinguished being in all other respects exactly like those with the 2-jointed club, I cannot help looking upon all these distinctions as sexual ones and uniting the insects in the same species.

The head from the eyes to the neck is of a transverse sub-quadratic form merging into the oval by the angles being rounded off; the anterior part is narrowed. This is the typical sculpture of the skull in all the 5 species of this group. The eyes in the present species are middling. The antennæ are rather approximated at the base and inserted in the centre of the front under a ridge which runs across it from eye to eye. The first joint is biacuminated at the apex, the 5th is longer than the adjoining ones, joints 7-9 in the individuals with the 2-jointed and 7-8 in those with the 3-jointed club are of a peculiar construction being narrowed at the apex and fitting into each other like the tubes of a spy-glass. The club joints are ovate, flat at the base, the last is large and obtusely acuminate. I consider the principal distinguishing character to lie in the remarkable structure of joints 7-9 of the antennæ. The maxil. palpi have joint 2 rather strongly incrassated at the apex, joint 3 obovate, narrowed at the base, joint 4 very minute, truncated at the apex. The mandibles are furnished with a bifid tooth and are strongly and abruptly dilated at the base. The thorax is of an obovate or obcardato-ovate form being rather strongly rounded off before the middle and gradually narrowed below it; the usual basal impressions are wanting. The posterior margin has 2 slight sinuosities, the posterior angles are rounded off or obliquely truncated. Scutellum obsolete. Elytra furnished with a very short elevated ridge at the shoulder. Legs elongated; coxæ large, the 2 posterior ones rather distant from each other; 2 posterior trochanters much elongated, incrassated at the tip; apex of tibiæ subcylindric, but not narrowed, and hairy, especially in the 2nd pair; joints 2-3 of the tarsi of equal size, the first longer, the 4th a little shorter, 2 anterior tarsi slightly contracted, 2nd and 3rd pair more and more elongated. Penultimate segment of abdomen with a strong longitudinal groove on the back.

31. *Scydmaenus femoralis*. N.

S. statura et magnitudine præcedentis; testaceus. Antennæ art. 3-4 subæqualibus, 5 præcedente longiore, 6-8 gradatim minoribus, subglobosis, 7-8 apice fortius oblique truncatis, 9-11 gradatim majoribus, subglobosis, clavam formantibus. Palpi maxill. art.

ultimo minimo semigloboso. Thorax magnus obovatus, basi rotundatus, 4 foveolatus. Elytra apice truncata, 2-sinuata. Pedes femoribus 2 posticis medio constrictis, tarsi art. 1-4 gradatim minoribus.

Of the general appearance of the former, but of a light yellowish colour, and well distinguished by the large thorax, truncated elytra, and abnormal construction of the 2 posterior femora. Antennæ with joints 7-8 rather strongly obliquely truncated at the apex, 9-11 forming a club, subglobose, flat at the base, the last acuminate and slightly cut away or even excavated on the inside at the apex. Last joint of maxill. palpi semiglobose, these otherwise the same as in the former. Thorax and elytra of *S. alatus*, the former however, larger, rounded at the posterior margin and with 4 basal impressions, the latter slightly truncated at the apex and with a slight sinuosity in the truncature on either side of the suture. Scutellum very small. Legs with the tibiæ slightly bent at the base, the apex as in the former; tarsi with joints 1-4 gradually decreasing in size, first pair contracted and furnished with brushes on the inside. The 2 posterior legs inserted rather distant from each other, the basal part of abnormal construction: the trochanters are much elongated and incrassated at the tip whilst the femora are at the place of the juncture rather abruptly narrowed, bent and slightly compressed; as they are at the same time thinner than the adjoining apex of the trochanter the constriction is very striking.

32. *Scydmaenus Ceylanicus*. N.

S. alati colore, sed major et magis depressus; long. corp. $\frac{3}{4}$ lin. Caput magnum, robustum, thoracis latitudine. Antennæ basi non approximatae, art. 3-4 et 5-7 inter se subæqualibus, arcum formantibus, 8-10 gradatim majoribus, subglobosis, depressis, apice oblique truncatis, 11° magno, conico, 8-11 longius pilosis, clavam formantibus. Palpi maxill. art. 4° minimo, semigloboso. Thorax ovatus, foveis basalibus nullis. Elytra apice singulatim rotundata. Pedes validi tarsi art. 1-4 subæqualibus, 2 anterioribus art. 1° *subtus acumine sat forti producto*.

An anomalous species, especially with regard to the antennæ which are much less approximated at the base than those of the rest of the species belonging to this group, and with regard to the

2 posterior coxæ, which, on the contrary, are more approximated than in any of the species just referred to. The insect is of the light brown colour of the two former, but larger and more depressed. The head is strikingly large and heavy, of the width of the thorax; in its hind part, which is strongly transverse, the oval form prevails over that of the square. Eyes small. Antennæ inserted under two strong protuberances rather than under a ridge; their club 4-jointed, joints 3-7 forming an inwards bent section of a circle, joints 8-10 strongly compressed, obliquely truncated (subperfoliated) 11 large, conic. The 3rd joint of the maxill. palpi is of an oblongo-ovate shape, the external basal angle is prolonged into a small peduncle inserted in the apex of the 2nd joint, the 4th joint, about the semiglobose shape of which I am not quite satisfied, appears to be obliquely inserted in the tip of the preceding. Thorax oval, of a similar shape to that of the former, anterior margin slightly emarginated. Scutellum obsolete. Elytra with the traces of a humeral costa, separately rounded off at the apex. Legs strong, 2 posterior coxæ not more distant from each other than the 4 anterior ones; tibiæ elongated, bent at the base and apex, at the latter place slightly narrowed, subcylindric and hairy; tarsi with joints 1-4 subequal, in the first pair strongly contracted, joint 1 of this pair produced in a spine on the inside.

b.) *Mesosternal carina middling, grooved.*

33. *Scydmaenus intermedius*. N.

S. alati statura sed major et robustior, colore obscuriore; long. corp. $\frac{3}{4}$ lin.

Antennæ art. 1° apice biacuminato, 2 et 5, 3 et 4, 7 et 8 inter se subæqualibus, 6 quarto paulo minore, obovato, 7-8 subglobois apice oblique truncatis, 9-11 gradatim majoribus, obovatis, clavam formantibus, 11 acuminato. Palpi maxill. art. 3° obovato, 4° minimo semiglobois. Thorax subrotundatus, basi 4-foveolatus. Elytra apice singulatim rotundata. Pedes tarsi art. 1-4 gradatim minoribus vel 2-3 subæqualibus, 4 anterioribus intus pilosis. Mesosternum sat fortiter carinatum, *carina dorso deplanata, fossulata, apice acuminata.*

This species stands in the middle between *S. alatus* and *pselaphoides*. To the former it is allied by its general appearance rather than by anything else, differing from it very much in the structure of the antennæ and the mesosternal carina. To the latter, on the contrary, it is allied by similarity in the structure of the said carina, differing, however, from it in general appearance. The colour is that of *S. alatus* but a shade or two darker, the insect being at the same time larger and altogether more robust. The eyes are small. Antennal club 3-jointed, the joints forming it gradually increasing in size, obovate, flat at the base, the last acuminate. Scutellum obsolete. Elytra with 2 slight basal impressions, the traces of a humeral costa, separately rounded off at the apex. Legs elongated as usual; 2 posterior coxæ distant, tibiæ straight, subcylindric but not narrowed at the apex, the 4 anterior ones hairy; tarsi with joints 1-4 almost imperceptibly decreasing in size or perhaps 2-3 equal, the anterior ones slightly contracted, these and the intermediate ones hairy on the inside. Mesosternal carina middling, flat on the back, with a shallow, but very distinct, longitudinal groove or excavation, anterior part projecting, acuminate.

34. *Scydmaenus pselaphoides*. N.

S. subpyriformi-ovatus, subconvexus, magis minusve brunneus, pedibus antennisque subtestaceis, femoribus apice nigrescentibus, tarsis palpisque testaceis; flavo-pubescent; long. corp. 1-1½ lin.

Antennæ art. 1º mediocri, apice biacuminato, 2-4 sensim minoribus, 5 et 2, 6 et 3, 7 et 8, 9 et 10 inter se subæqualibus, 9-11 clavam formantibus, 6-11 basi rotunde truncatis, 6-8 apice oblique truncatis, 7-8 compressis, 9-11 obovatis. Mandibulæ dente bifido munitæ, basi dilatatæ et ciliatæ. Palpi maxill. art. 3º invertè conico, 4º minimo apice truncato. Thorax obovatus, latitudine quarta parte longior, basi 4 foveolatus. Elytra apice singulatim rotundata. Pedes validi, tarsi art. 1-4 gradatim minoribus, anterioribus dilatatis, his cum intermediis subtus fortius pilosis. Mesosternum præcedentis.

An anomalous species with regard to its general appearance, which differs considerably from that of the rest of the group, and makes it, as I have remarked above, the connecting link between this and

the following group. This is the largest species I have hitherto met with. The system of coloration is the usual one : more or less deep brown, legs and antennæ lighter, tarsi and palpi quite so. Eyes middling. Antennæ with a 3-jointed club, the joints subglobose, flat on the base, the last large, conic, joints 6-8 are slightly truncated at the apex, 7 and 8 being at the same time strongly compressed have a sub-perfoliated appearance. The mandibles are furnished with a bifid tooth. The 3rd joint of the maxill. palpi is of the shape of an inverted cone, the 4th minute and truncated at the apex. The thorax is of an obovate form, about $\frac{1}{4}$ longer than broad, rounded off before and gradually narrowed below the middle, subquadratic at the base impressed with 4 foveæ or pits, the posterior angles rounded off. Scutellum minute. Elytra with 2 short humeral costæ, separately rounded off at the apex. Legs stout ; 2 posterior coxæ distant ; tibiæ slightly bent at the base, subcylindric at the apex, the 4 anterior ones hairy ; tarsi with joints 1-4 gradually decreasing in size, the anterior ones dilated, the joints transversely triangular, the intermediate pair hairy on the inside. Mesosternum of the preceding. Metasternum with a slight longitudinal depression down the middle. Penultimate abdominal segment grooved on the back as in *S. alatus*. In the enlargement of the anterior tarsi lies undoubtedly as in other beetles a sexual distinction, as it is not equally strong in all individuals. I may mention here that upon some of the individuals I found ticks (some g. allied to *Ixodes* but not a *Gamasus*) fastened, one of them having made a wound such as, supposing it to be inflicted at a corresponding place and on a proportionate scale, few animals of a higher order, I think, would have survived—still this little beetle appeared perfectly at its ease. The parasite alluded to had fastened itself right in the centre of the forehead and the wound it had inflicted in this, one should imagine most dangerous place, was a deep hole or pit with a callous border. The latter led me to infer that the injury was an old one, and the tick being at the time fastened in it (and this so firmly that I had some difficulty in detaching it) I felt sure it had been in this position for months. The injury was observable under a slight magnifier, and to compare it to one inflicted by a rifle-ball would I think be greatly underrating its importance.

II. *Fourth joint of the maxill. palpi acuminated ; mesosternal carina strongly developed ; eyes large, prominent, coarsely granulated ; antennæ distant at the base ; 2 posterior trochanters simple ; thorax variable ; body robust, pyriform ; subconvex.*

a) *Occiput rounded.*

35. *Scydmcenus advolans. N.*

S. long. corp. $\frac{3}{4}$ lin. Antennæ art. 3 et 4, 5 et 6, inter se subæqualibus, obovatis, 7 majore, subgloboso, 8-10 subglobosis, basi rotunde—, apice oblique—, truncatis, cum 11° conico clavam formantibus. Palpi maxill. art. 3 elongato, inverte conico, 4° mediocri. Mandibulæ tenues, medio acuminate 1-dentatæ, basi abrupte dilatatæ. Thorax ovato-rotundatus, apice fortius angustatus, basi leviter 2-sinuatus, 4-foveolatus. Elytra apice singulatim rotundata. Tarsi art. 2-3 subæqualibus.

The insect is of a brown colour, the antennæ lighter, the legs still more, and the tarsi and palpi quite so ; the femora are dark towards the apex ; the head, thorax and suture are occasionally of chestnut colour ; it is as usual pubescent. The sculpture of the head in this and the following species is not, as in the preceding, based upon the oblong square or the oval, but rather upon the form of a ball, which in a more or less compressed state is always perceptible ; in some instances it is narrowed on one side. In the present species the head is heavy and subglobose. The eyes are large, prominent and coarsely granulated. The antennæ are inserted distant from each other under 2 protuberances of the anterior part of the forehead. The club is 4-jointed, the joints composing it being flat at the base, and, with the exception of the last, obliquely cut away at the apex, the last itself being conic. The maxill. palpi have joint 3 rather elongated and of the form of an inverted cone, joint 4 middling, acuminate. The thorax is of a rounded oval shape and rather strongly narrowed towards the apex. The scutellum is obsolete. The elytra have the usual rudimentary costæ at the shoulders and are separately rounded off at the apex. The legs are middling ; 2 posterior coxæ inserted close together ; trochanters all simple ; tibiæ slightly bent at the base, narrowed and subcylindric at the tip, the 4 anterior ones hairy ; tarsi with joints 2-3 subequal, the first a

little longer and the 4th shorter, the 2 anterior ones slightly contracted. I include in this species some individuals which slightly differ from the foregoing description, being more robust, covered more densely and with longer hair, especially on the occiput and thorax, with the latter rather obconico-ovate and the costæ of the elytra more distinct, and moreover occasionally of a chestnut colour.

36. *Scydmaenus pubescens*. N.

S. præcedente gracilior; long. corp. $\frac{2}{3}$ lin. Antennæ art. 3 et 4 5 et 6 inter se subæqualibus, subcylindricis, 7° secundo paulo minore, *fortiter cylindrico*, 8-10 subglobosis, cum 11° conico clavam formantibus. Palpi maxill. art. 3 inverte conico, 4° minuto. Mandibulæ tenues, medio obtuse obsolete unidentatæ, basi abrupte dilatatæ. Thorax conicus, latitudine haud longior, basi 4-foveolatus. Elytra et pedes præcedentis, tibiis tamen apice leviter arcuatis.

Less robust than the former and further distinguished from it by the 7th antennal joint (the one preceding the club), which is of a strongly cylindric shape, by the minuteness of the last joint of the maxillary palpi, the obtuse and nearly obsolete tooth of the mandibles, the short conical form of the thorax, and the tibiæ which are slightly bent at the apex.

37. *Scydmaenus pygmæus*. N.

S. statura et colore præcedentis sed longius pubescens et æsqui minor; long. corp. $\frac{1}{3}$ lin. Antennæ art. 3 et 4, 5 et 6 inter se subæqualibus, 7° majore, ovato, 8-10 subglobosis, fortius compressis, cum 11° clavam formantibus, hoc magno, obconico, apice obtuso. Palpi maxill. art. 2° tenuiore, 3° inverte conico, 4° minuto. Mandibulæ obsolete unidentatæ. Thorax conicus latitudine parum longior, elytris fortiter applicatus, basi 2-sinuatus et 4-foveolatus. Pedes et elytra præcedentis, his tamen amplioribus.

Strongly allied to the 2 preceding species, but very much smaller, more compact and covered with longer hair—thus of rather a different appearance regardless of its size. From *S. pubescens* this species would principally differ in the shape of the 7th antennal joint, also in that of the 3 first club joints which are much more

compressed and more hairy in *S. pygmæus*. The thorax of the latter is more firmly applied to the base of the elytra, the latter have a fuller, more robust appearance about them, the palpi are more slender and the tooth of the mandibles is pointed. From *S. advolans* it would principally differ, besides in the generalities mentioned above, in the shape of the thorax and in some of the points in which it differs from *S. pubescens*.

b) *Occiput narrowed.*

38. *Scydmaenus glanduliferus*. *N.*

S. robustus; long. corp. $\frac{3}{4}$ lin. Antennæ art. 3-7 sensim majoribus, 8-10 globosis, fortiter compressis, cum 11^o glanduliformi clavam formantibus, longe ciliatis. Palpi max. art. 2^o tenuiore, 3^o invertè conico, 4^o mediocri. Thorax conicus latitudine basali haud longior, elytris fortiter applicatus, basi 2-impressus, in impressionibus 2-foveolatus. Tarsi art. 2-3 subæqualibus.

Of the size of *S. advolans* and the plump shape and colour of *S. pygmæus*, the latter being rather lighter than that of *S. advolans*; it has the longer hairy vesture of the former (especially on the occiput and thorax). The occiput is slightly narrowed behind. The antennal club is composed of 4 joints, the 3 first of which are strongly compressed, the 4th being plump and of the shape of an acorn with its cup; all are strongly ciliated. The thorax is conic, firmly applied to the base of the elytra as in the preceding species, depressed and with 2 pits, at the base posterior margin with 2 sinuities. The shoulder-ridges of the elytra are short but rather strongly marked. The tibiæ are narrowed, subcylindric and hairy at the apex. Joints 2-3 of the tarsi are subequal, the anterior pair more, the intermediate less contracted.

39. *Scydmaenus graminicola*. *N.*

S. gracilior; long. corp. $\frac{3}{4}$ lin. Antennæ art. 3 et 4, 6 et 7, 9 et 10 inter se subæqualibus 5^o adjacentibus paulo longiore, 3-7 subcylindricis, 8 subgloboso, 9-10 fortiter globosis cum 11^o clavam formantibus. Palpi maxill. art. 3^o invertè conico, 4^o mediocri. Mandibulæ apice arcuatæ, medio acuminate 1-dentatæ, basin versus sensim dilatatæ. Thorax obconicus basi depressus, 2-sinuatus et 2 fo-

veolatus, rectangulatus. Pedes *tibiis elongatis* basi apiceque arcuatis.

Of the usual brown colour, legs and antennæ lighter, tarsi and palpi quite so, femora nigrescent at the apex, hairs of occiput and thorax rather long. The former slightly narrowed behind, the head thus of a somewhat rhomboid form. Antennal club composed of 3 joints, the 2 first of which are strongly globose, the last being acuminate and slightly cut away on one side at the apex. The mandibles are furnished with an acuminate tooth at the middle, bent at the apex, and, what is rather uncommon in this g., gradually enlarged towards the base. The thorax is obconic, rather longer than broad. The elytra are somewhat more stretched than usual in this group, the rudimentary humeral costæ are rather prominent, they are separately rounded off at the apex. Tibiæ more or less elongated, slightly bent at the base and apex, at the latter place subcylindric and hairy. Tarsi with joints 2-3 subequal, first pair slightly contracted. A sexual distinction appears to be expressed in the length of the tibiæ which are less elongated in certain individuals which are at the same time less robust than the others. The insect is easily distinguished by its general appearance.

40. *Scydænus pyriformis*. N.

S. supra castaneus, subtus brunneo-testaceus, pedibus antennisque dilutioribus, tasis palpisque flavo-testaceis, antennarum clava nigricante; long. corp. $\frac{1}{2}$ lin.

Antennæ art. 3-8 fere subæqualibus excepto 5° parum longiore, 8° subgloboso, miuore, 9-10 subglobosis majoribus cum 11° acuminato clavam formantibus. Palpi maxill. art. 3° inverte conico, 4 miuuto. Thorax obovatus, basi 2 foveolatus. Pedes coxis 2 posticis, distautioribus; tibiis 2 auterioribus basi apiceque leviter arcuatis, reliquis subsimplicibus; tarsis art. 2-3 subæqualibus.

A pretty little species, at once distinguished by its colour which is chestnut, darker at the base and suture of the elytra, and light, more or less brownish or yellowish, below; the antennæ being of the latter colour with a nigrescent club. The occiput is slightly narrowed, the head altogether plump, heavy and transverse. The antennal club is composed of 3 subglobose joints the last of which is acu-

minated and slightly cut away on one side as in some of the preceding species. The thorax is obovate, broadest below the middle, and gradually narrowed towards the apex. The elytra have the usual 2 shoulder-ridges and are rather strongly dehiscent at the apex. The 2 posterior coxæ are rather distant at the base; the tibiæ are slightly angustated and subcylindric at the apex, the 4 anterior ones hairy, the first pair moreover slightly bent at the base and apex, but the rest nearly straight.

41. *Scydmaenus angusticeps*. N.

S. castaneus, antennis pedibusque dilutioribus, tarsis palpisque testaceis; long. corp. 1 lin.

Caput magnum subtrigonum, occipite *fortiter angustato*, hoc et thorace longe pilosis. Antennæ art. 3 et 4, 5 et 6 inter se subæqualibus, 7-11 gradatim majoribus, vel 9-10 subæqualibus, subglobois, 8-10 leviter depressis, cum 11° clavam formantibus. Palpi maxill. art. 2° tenuiore, 3° inverte conico, 4° mediocri, conico-acuminato. Thorax obconicus, basi subquadratus, 2-sinuatus et 4-foveolatus. Elytra costis 2 fortioribus abbreviatis. Tibiæ subrectæ.

A handsome species of a chestnut colour more or less deep with lighter legs and antennæ. The head is large, heavy, and from the eyes to the neck strongly triangular; the occiput and thorax are covered with long hair, which adds much to the peculiar appearance of the insect. The antennæ are thick and robust, the club 4-jointed. The thorax is subquadratic at the base up to the middle and conic towards the apex. The punctures or pits at the base are 4 in number. The scutellum is small. The humeral costæ are more strongly developed than in any of the other species and traceable to the middle of the elytra. The tibiæ are nearly straight, subcylindric at the apex; the 4 anterior ones hairy. The tarsi have joints 2-4 nearly subequal.

B. *Species without a neck.*

42. *Scydmaenus ovatus* N.

S. *ovatus*, convexus, brunneus; long. corp. $\frac{1}{2}$ lin.

Caput subquadrato-ovatum. Antennæ art. 3-11 sensim incrassatis, 9-11 subglobois, depressis, cum 11 magno, conico clavam

formantibus. Palpi maxill. art. 4 minuto acuminato. Thorax *amplus semiorbicularis*, margine posteriore medio producto, basi 2-foveolatus. Tarsis art 1-4 subæqualibus.

The colour of this insect is as usual shaded off from brown to light yellow; however, in other respects it differs materially from all the preceding species. The body is regularly oval, thorax and elytra convex, pubescent. The head is subquadratic—ovate; the eyes rather small, but prominent; the neck is altogether wanting. The antennæ are at the base as distant from each other as they can be, being inserted below the eyes; the club is 3-jointed; the joints increase gradually in size from the 3rd to the 11th. The maxill. palpi have the 2nd joint slender, the 3rd rather pear-shaped, the 4th minute and acuminated. The thorax is very ample, semiorbicular, of the shape and nearly the size of the apical half of the elytra; the basal angles are acuminated and slightly envelop the shoulders; the posterior margin is prolonged in the middle, towards the scutellum; the foveæ or basal impressions are 2 and rather distant from each other. Scutellum obsolete. Elytra with 2 depressions at the base. Tibiæ straight; tarsi with joints 1-4 subequal or very nearly so. Mesosternal carina middling.

Report on the Proceedings of the Magnetic Survey, from January to May 1856, by HERMANN SCHLAGINTWEIT.

ROUTES.—After having completed the observations at Gowhatty, detailed in my last Report* I left Gowhatty, December 21st, and proceeded up the Brahmaputra to Mungeldie, and from thence to Oodulgoorie on the Frontier of Assam and Bhootan.

I found occasion to proceed from this place into the country of the Kambo-Bhootans, who occupy the Himalayas East of Bhootan Proper; while my Assistant, Mr. Adams, and the Draftsman, Abdool, who accompanied me as far as Oodulgoorie, went to the coal mines and salt wells in the Baree Dihing.

* See Journal No. 1, 1856, p. 30.

I made arrangements, immediately after my arrival at Oodulgoorie, with a former Rajah of Towang-Chang-To, who was found willing to be my guide as far as Nurigoon, which is situated at about one-third of the breadth of the Himalayas.

I staid four days at Nurigoon, and besides taking magnetic observations, (the instruments had been, till used, carefully concealed in cotton bags,) I succeeded in making an excursion to the Zinghyla (Deer Mountains) in order to survey the different valleys and make some drawings.

Here too I got some very valuable information (not from the inhabitants, but from traders coming down from Thibet) about the routes to Lowany, only 4 marches distant, and to Lhassa.

A very intelligent Bhootea from Tussisoodun even constructed a map, with a vertical Section in the Chinese style, of the route from Nurigoon* to Lhassa, which agreed very well with the verbal information I received from the Thibetans.

Nurigoon is situated on a rock on the left side of the Riju at a height of from 3,200 to 3,500 feet, and offers many interesting features for comparison with the Western Himalayas.

The valleys here rise much more *gradually* than in the Western parts of the Himalayas; at the same time the height of the mountains is less and the inclinations less steep. The vegetation has the luxuriant character peculiar to the Eastern Himalayas, though the quantity of rain is much less than in the lower ranges of the Naga, Khosia and Garrow Hills, on the left side of the valley of the Brahmaputra.

Yâks come down from Thibet as far as Nurigoon in the cold season and chiefly towards the end of it, when the trade with the plains is greatest; and wild elephants are very frequent in the valley of the Dhunsiri and the Riju, and are occasionally met with even a little above Nurigoon. Such coincidences of lower and upper limits of animals, so different in reference to their zones of altitude, may perhaps be not without interest in explaining the variety of fossil remains in places which were formerly under similar local and climatological conditions.

* This Map is included in the drawings, portfolio the 6th, sent from Calcutta to the Hon'ble the Court of Directors.

I left Nurigoon January 13th and went to Tezpore, and from thence to Debrooghur in Upper Assam, where, besides, my own observations, I obtained much valuable information, particularly from Colonel Hannay, about geological subjects.

From Debrooghur I descended the Brahmaputra and went by Goalpara, Serajunge, Koolna, and through the Sunderbunds to Calcutta.

After a stay of twenty-nine days I proceeded by Cawnpore, Agra and Umballa to Simla, visiting Lucknow in Oude and Meerut for magnetic observations.

I arrived at Simla on the 24th. From hence Ladak, and the ranges of this part of the Himalaya and the Kuenluen, will be examined.

Two of the four Sikim men I had with me in Sikkim and Assam, the Lepcha Chezy and the Bhootea Dublong, are to make some observations during this summer in Sikkim, furnished with some thermometers, a boiling thermometer, and a prismatic compass.

Mr. Montairo, attached to my Establishment for collections, left Darjiling August 23rd, and went to Calcutta, where he received, and packed for transmission to Europe, the collections sent down to him from the Khosia Hills and Assam. He arrived at Simla May 20th. He is going *vid* Kangra to Kashmere.

MAGNETIC OBSERVATIONS.

Magnetic observations have been made at the following Stations :—

A—Assam and Delta of the Ganges.

1. *Oodulgoorie*, on the Bhootan Frontier—December 30th and 31st, 1855, January 1st, 2nd, 3rd and 4th, 1856. Declination, horizontal intensity, vertical intensity, and a set of observations for ascertaining the daily variations, longitude and latitude.

2. *Nurigoon*, in Bhootan—January 9th, 10th and 12th. Declination, horizontal and vertical intensity, longitude and latitude.

3. *Tezpore*, on the right shore of the Brahmaputra—January 24th, 25th and 28th. Declination, horizontal and vertical force, longitude and latitude.

4. *Debrooghur*, Upper Assam—February 5th and 6th. Declination, horizontal and vertical intensity, longitude and latitude.

Gowhatty—see preceding Report.

5. *Serajgunge*, on the right shore of the Keur River—February 17th. Vertical intensity.

6. *Dacca*—February 21st. Vertical intensity.

7. *Koolna*, on the right shore of the Bhogrup—February 24th. Declination, vertical force, longitude and latitude.

8. *Calcutta*, Botanical Garden, March 23rd and 24th. Declination, horizontal and vertical intensity, longitude and latitude.

B—Plains of the Ganges in Hindoostan.

9. *Benares*—April 3rd and 4th. Declination, horizontal and vertical intensity, longitude and latitude.

10. *Lucknow*, Oude—April 8th and 9th. Declination, horizontal and vertical intensity, longitude and latitude.

11. *Agra*—April 15th. Declination.

12. *Meerut*—April 18th. Declination.

The magnetic elements were therefore determined from between latitude 22° to $27^{\circ} 5'$ N. in the valley of the Brahmaputra, and to 29° in the plains of the Ganges including a difference in longitude of $16^{\circ} 5'$ from 95° to $78^{\circ} 5'$ East of Greenwich.

One of the general results was, that the magnetic force, particularly the dip, has been found much greater than is indicated by the general formulæ.

The Dip.

A.—In the valley of the Brahmaputra and delta of the Ganges, the dip was found to be—

At Debrooghur,	..	..	..	$38^{\circ} 29' 17$
„ Tezpore,	..	..	..	$37 \quad 14 \quad 58$
„ Oodulgoorie,	..	..	..	$36 \quad 27 \quad 52$
„ Nurigoon (Bhootan,)	..	..	..	$37 \quad 11 \quad 69$
„ Gowhatty,	..	..	..	$35 \quad 18 \quad 73$
„ Serajgunge,	..	..	..	$32 \quad 3 \quad 15$
„ Dacca,	..	..	..	$31 \quad 0 \quad 80$
„ Koolna,	..	..	..	$29 \quad 18 \quad 49$
„ Calcutta,	..	..	..	$28 \quad 6 \quad 4$

B.—In the plains of Hindoostan it was—

At Benares,	..	..	..	$32 \quad 40 \quad 9$
„ Lucknow,	..	..	..	$35 \quad 18 \quad 20$

A similar result has been found by my brothers for the parts of corresponding latitude in the North-West Provinces and in Central India.

The Southern part of India seems to agree better with the results of calculation.

The Declination.

The declination was not found to alter so irregularly in any of the places examined, as we formerly found to be the case at Cherrapunji, though the granite rocks in the valley of the Brahmaputra on both sides of the river are identical with the rocks of the Khosia and the Garrow Hills along the left edge of the Brahmaputra valley, and the geological situation of the Himalayas along the right side of the valley is very different. Some of these rocks in the valley contain, as well as in the Northern parts of the Khosia Hills, a very great amount of magnetic iron (in the rocks near Doobree, Colonel Hannay recently has found it particularly predominant); but the action on the needle is confined to the place itself, and becomes at a very small distance untraceable.

The declination in the territory examined was *East*, being greatest at Koolna and decreasing East and West of it. In Assam, as well as at Meerut, a small increase is caused by the difference in latitude. In Nurigoon, as in the Himalayas in general, the declination is decidedly greater than the difference of latitude would lead us to expect.

A.—In the valley of the Brahmaputra and Delta of the Ganges, the *declination* was found to be—

At Debrooghur,	..	..	..	N. 2°	8'	E.
„ Tezpore,	..	..	..	N. 1	59	E.
„ Oodulgoorie,	..	..	..	N. 2	5	E.
„ Nurigoon (Bhootan,)	..	..	..	N. 4	5	E.
„ Gowhatty,	..	..	..	N. 1	41	E.
„ Koolna,	..	..	..	N. 2	55	E.
„ Calcutta,	..	..	..	N. 2	24	E.

B.—In the plains of Hindoostan—

At Benares,	..	..	..	N. 1	27	E.
„ Lucknow,	..	..	..	N. 1	12	E.
„ Agra,	..	..	..	N. 1	14	E.
„ Meerut,	..	..	..	N. 1	28	E.

METEOROLOGY.

In Assam, observations were made on the variations of the temperature of the Brahmaputra, from Debrooghur to its ramifications in the Delta, a subject of particular interest. Also, besides the regular observations on the temperature, moisture, and pressure of the air, I made several experiments on the thermic influence of surfaces covered with grass and tree jungle; and Dr. Simmons, at Gowhatty, kindly assisted me during my absence, by making observations on the ozone contained in the air, with papers identical with those used by myself.

These observations are being continued for the next year.

The following Table contains* the temperature found in the Brahmaputra, in its ramifications, and in the Delta, from Debrooghur to Calcutta. The daily variations, even in Upper Assam, scarcely exceeded 0.5 degrees C. = 0.9 degrees F., but occasionally differences of 2 to 3 degrees F. are found even in the very current, caused in some cases by differences of depth, in others by lateral rivers discharging themselves into the Brahmaputra.

I choose for the Table the temperature of the rivers at 11 A. M., this hour representing very nearly the mean of the twenty-four hours for the water; for the temperature of the air for the same reason the temperature at 9 A. M. is selected. Errors of the zero points of the Thermometers Nos. 29, 70 and 88 are corrected.†

* A second series during the hot season is now being made by my Assistant, Mr. Adams, on his way down from Sudiya.

† For the Hooghly, at Calcutta, I was furnished with observations on the monthly variations of the temperature at high and low water by the kind assistance of Mr. Schiller. The observations are now being continued by Dr. Thomson.

Temperature of Rivers.

Names of Rivers.	Names of the nearest Places.	February 1856.	Temperature of the water at 11 A. M.	Temperature of the air at 9 A. M.
			° Centigrade.	° Centigrade.
Brahmaputra, ...	At Debrooghur, ...	6	15.6	12.4
"	Above Dikhoo Mookh, ...	8	15.7	12.6
"	Above Dhunsiri Mookh, ...	9	16.2	13.7
"	Tezapore, ...	10	17.1	16.2
"	At the mouth of the Kulluny, ...	11	17.2	15.8
"	Gowhatty, ...	13	17.5	14.6
"	Above Doobree, ...	14	17.8	17.0
"	Below Doobree, ...	15	18.4	19.3
"	Bugwa, ...	16	19.4	18.6
"	Hajeepore, ...	17	19.3	18.7
Zuboonna, ...	Serajgunge, ...	18	19.6	20.7
"	Amerbad, ...	19	19.7	22.1
Kertinana, ...	Senpore, ...	20	21.2	21.7
Bargunga, ...	Kalaghaut, ...	21	22.8	22.8
Damudar, ...	Burrissole, ...	22	21.6	21.8
Charecollee, ...	Bidaboorea, ...	23	21.6	21.4
Passur, ...	Koolna, ...	24	22.0	20.5
Seprah, ...	Near Grant No. 214 Sunderbunds, ...	25	23.5	23.4
Terra Banka, ...	Near Grant No. 155 Sunderbunds, ...	26	23.8	25.5
Moree Gunga, ...	East of Saugor Island, ...	27	24.6	26.1

The variation of the temperature of the air is $26^{\circ} 1 - 12^{\circ} 4 = 13^{\circ} 7$, C., of the water $24^{\circ} 6 - 15^{\circ} 6 = 9^{\circ}$ C.

In the Dhunsiri and in the Riju, the difference between the temperature of the Dhunsiri near Orang in the valley of Assam and of the Riju, a lateral affluent of the Dhunsiri at Nurigoon, was

Dhunsiri,	18° 1
Riju,	9 0

Diff 9 1 C.

During my journey from Calcutta to Umballa, I also several times, tried some experiments to measure the heating power of the sun's rays under various conditions.

I used for a complete observation, the following thermometers :—

1. } Dry and wet bulb for temperature and moisture of the air.
2. }

3. A thermometer exposed to the sun with white bulb. It had no brass scale, and a very thin capillary tube for the mercury, surrounded by a larger glass tube, the ordinary form of thermometers on the Continent. The advantage of this is that the instrument indicates nearly without error the temperature of the mercury in the bulb unaffected by the disturbing influence of appendices. But even in this shape, a thermometer offers no absolute measure for insolation, the whiteness of the glass forming the bulb, its colour and transparency modifying very appreciably the apparent action of the sun on different instruments.*

4. A thermometer of a similar construction, with blackened bulb.

5. A Kew standard thermometer, with thick glass tube, the divisions being in the glass stem. It had its bulb blackened, and also half of the mantle of the cylinder behind the divisions. This, as well as the following, was placed on a large surface of black wood, which getting heated all round, very nearly as much as the thermometer itself, prevents an irregular loss of heat towards objects of different temperature in its vicinity; the presence of grass or gravel, for instance, would otherwise affect the reading of the thermometer. It may be considered as a good proof of the comparability of the thermometers in such an arrangement, that the Kew standard and the following thermometer, No. 6, stood very nearly alike.

6. A boiling thermometer, every degree divided into 50ths, the mercury begins to reach the divided scale only at 78 degrees C., being intercepted by a second enlargement of the tube. Bulb blackened. The mercury contained in the capillary tube being here only a very small part of the mercury under the black stratum, and being protected besides by a second outer glass cylinder against loss of heat, I found this instrument the best for these experiments as long as the insolation was hot enough to raise the mercury to the divided part. Besides, the $\frac{1}{100}$ th of the degree being read with perfect accuracy, it showed very rapidly even the minutest changes in the atmospheric conditions.

7. The surface of the ground. The thermometer was placed in the reddish sand forming the general deposit in the plains of Hin-

* For relative determinations for distance, and for the annual and daily variations, careful observations with any thermometer would be very useful.

doostan. It was during the first experiments covered with a stratum of the sandy soil about one centimetre thick, but in the experiments at Umballa a little hole was filled with mercury and this covered with the stratum of soil. By this arrangement the thermometer was kept through the medium of the mercury, in a much more intimate contact with the particles of the soil, the temperature of which it was to indicate.

8 and 9. Metals exposed to a tropical sun feel remarkably hot when touched, but this is due in a great measure to their conducting power. Their real temperature seemed an interesting object for direct determination. I therefore exposed two metal vessels, the one an iron bottle, well screwed and filled with mercury to two-thirds of its volume; the other a flat square copper basin (used generally as an artificial horizon,) blackened, with about two cubic centimetres of mercury distributed over it in isolated drops. Both were put upon a soft and thick layer of cotton. In making the observation with the copper basin, the cotton was slightly pressed down at one side, so as to incline the basin without the necessity of touching it, causing the mercury to collect in one corner. The thermometer was then dipped into the mercury, which it might be expected had assumed the temperature of the metallic surface with which it was in contact.

The following Table contains the reading of the different thermometers at Umballa; the correction for index errors are applied to the reading. The instruments with black bulbs and on black wool were read with a telescope from 4 to 5 feet distance, since any near approach to read them with a magnifier altered very suddenly the indications of the thermometers.

Observations on insolation at Umballa, April 22nd, 1856, Centigrade.

HOURS, LOCAL TIME,	...	...	...	6 A. M.	7-15	8	9	10	11	11-54	1-4 P. M.	2	3	4	5-30
HEIGHT OF THE SUN, } Latitude 30° 20' 7" N.,	...	...	...	6.12	18.7	31.9	44.75	56.9	67.25	71.9	60.5	56.9	44.75	31.9	12.6
AIR, ... { Dry, ...	...	...	...	21.2	22.8	24.7	33.1	34.3	36.4	38.2	39.3	39.7	39.4	39.3	39.3
Wet, ...	...	...	...	9.5	10.0	12.1	16.3	16.4	17.2	18.3	18.0	18.0	17.9	17.9	18.0
SUN, ... { White, ...	...	...	...	...	...	...	36.3	37.7	41.4	42.2	43.4	43.4	42.7	41.4	40.7
Black, ...	...	...	...	...	...	...	38.4	40.8	44.1	45.8	45.2	45.1	45.1	42.9	42.3
SUN, ... { Keen, ...	...	...	...	...	...	...	57.5	77.2	73.9	87.5	67.9	67.4	58.2	52.0	49.0
Boil, ...	...	...	...	...	...	...	...	80.65	...	89.47	...	...	...	...	...
SURFACE OF GROUND, ... {	...	...	...	In shade 19.3	In sun, 32.3 Shade, 21.0	...	...	44.3	47.9	50.2	51.7	51.9	49.9	48.2	44.2
METAL, ... { Black Surface, ...	...	...	...	...	...	...	...	...	...	...	55.2	55.2	53.7	50.3	...
Metallic Surface, ...	...	...	...	...	...	...	...	...	...	...	54.4	54.2	52.0	50.5	...

REMARKS.—Some small clouds at 11 A. M.; hazy, but no clouds from 12-10, with W. by N. wind; hot wind.

The haze, during the experiments at Umballa, though generally accompanying the hot winds, modified the heat, particularly for the boiling thermometer; also the small clouds, though very thin, and not covering the sun at the moment of the reading, had caused a sensible depression in the black thermometers *on the wool*; the other black bulb, freely suspended, being much less sensible for the rays of the sun, since the objects against which it radiated changed their temperature but very little (*see* "Surface of Ground,") went on steadily rising.

The great heat of the *air* lasting till sun-set is very characteristic of days with hot winds in general; also the surface of the ground keeps remarkably warm during the first hours after sunset though it loses 25 degrees C. during the night.

Notwithstanding this great variation, no particle of dew is deposited in these regions during nearly three months, the wet bulb thermometer sinking even 10 degrees lower during the night than the dry one.

The power of the sun's rays was also determined at Benares and Cawnpore.

At Benares the boiling point thermometer, in an arrangement like the one just described, was exposed on the 3rd of April.

It stood at 12 H. 30 M., 78°.15 Centigrade.*

1	„	5	„	.....	82.60	„
1	„	10	„	.....	84.23	„
1	„	15	„	.....	84.08	„

The maximum seems to fall decidedly after 12, (the sun's power decreasing less rapidly than the loss of radiation is diminished by the general increase of the temperature of the air continuing till 2 or 3 P. M.) The maximum on normal days, without clouds, and with very light wind, seems to be reached pretty regularly at 1h. 10m. to 1h. 20m. P. M.

At 1h. 29m. the wind at Benares became more violent, about 6.5 metres per second, and *felt* very hot. To my surprise the thermometer immediately went down, the thermometer with the white bulb in the sun also fell, though very little. Evidently the instruments had gradually surrounded themselves with a stratum of

* The readings are corrected for index errors.

heated air, corresponding with the temperature of the mercury, which, during the periods of stronger wind, was removed, and replaced by one less hot.

The readings were

At 1.42 P. M. 82.60 Centigrade.

(Wind increasing very much at 1.44 P. M.)

Thermometer at 1.46 P. M. 78.74 „

It rose again, in a slight lull, from 1.53 to 2.10 P. M.

It stood at 2.10 P. M. 80.45;

then the wind setting in again, it gradually sank, and soon (2.35 P. M.) disappeared below the divided scale.

At Allyghur, April 17th, the day was particularly clear; the West wind hot, but not very strong. Here I found the highest temperature I had yet observed, *viz.* 90° 30 C. or 194 54 F,* the time of this maximum, 1.20 P. M., coinciding very nearly with that observed at Benares.

I was enabled to compare my instrument with one used by Mr. Gubbins,† the bulb of which was protected against lateral radiation, by being enclosed in a double cylinder of glass. The two instruments agreed, at least for the maximum, better than might have been expected. The time of the maximum was naturally, not so well defined in the one enclosed in the glass tube, as in the other lying on wool: the former was too cold before the period of its maximum, too warm afterwards. The readings were on April 3rd—

	<i>Schlagintweit.</i> Hypsometer No. 5.	<i>Gubbins.</i> In glass cylinders.	Black bulb exposed free.
12-0 {	88.58 C. 191.44 F.	190.5	126.0
1-15 {	90.13 C. 194.23 F.	Disturbed by ap- proaching too near.	127.1
1-20 {	90.30 C. 194.54 F.		
1-45 {	86.10 C. 186.98 F.	188.0	119.0
2-35 {	80.60 C. 177.08 F.	185.0	122.0

* Corrected as the following for index error.

† We are deeply indebted to Mr. and Mrs. Gubbins for the communication of

When the hot winds are very violent, they diminish the power of insolation very much owing to the quantity of dust they raise, which very often, like thick aqueous clouds, completely hides the position of the sun, and sometimes even produces a darkness like the thickest fog.

I noticed a peculiar coloration of the sun during dust-storms, which is, I think, a regular phenomenon accompanying them, when the air has lost a certain amount of transparency.

In fogs the disk of the sun is red, or at least of a decided reddish tint, when sufficiently darkened to be looked at without a dark glass. In dust-storms the sky has also, as in fogs, a decidedly reddish colour, which in this case is that of the dust itself, but the sun's disk is blue, a phenomenon evidently connected with the suspension of solid particles in the air.* I observed this colour best on the 6th of April at Futtehpore. The hot wind lasted from 12.45 to 6.10 P. M., and stopped very suddenly after sunset. The sun was very much obscured as early as 1 P. M., and had then assumed this blue appearance so decidedly, that it looked like the sun's disk seen through a dark-blue glass, the shadow of a thin cylinder falling on white paper was nevertheless well defined and reddish, showing that the illuminated paper had received rays of the (complementary) bluish colour.

The blue colour of the sun, though the light was gradually much diminished, lasted until 5.10 P. M., when the sun had a height only of about 15 degrees: then the disk soon disappeared entirely behind the clouds of dust.

The temperature of the air† was corrected for index errors on the 3rd of April—

a series of most accurate meteorological observations, which not only embraced the ordinary objects of observation, but in which, at the same time, a great variety of experiments were combined with equal skill and ingenuity.

* A similar dust-cloud passing perhaps at a small height above the ground may explain the blue appearance of the sun mentioned in the Second Edition of Sir John Herschel's *Astronomy*.

† A room with tatties was easily kept at 25° to 27° C. in the centre of the apartment, the wind being very strong.

	<i>Dry.</i>	<i>Wet.</i>	
At 12,	38.2	19.9	} Direction of the hot winds West, very strong, from 12.45 to 6.10.
1,	38.1	19.0	
2,	37.3	19.3	
3,	37.3	19.3	
4,	37.3	19.2	
5,	36.7	19.1	
6,	36.4	18.9	

The temperature of the air diminished, as occasionally noticed in the observations above-mentioned, with the increase of the wind and discoloration of the air.

A coincidence worthy of notice is the sudden cessation of the wind after sunset, which took place at every one of my observations. Generally speaking, it is characteristic of the hot winds that in the beginning of the hot season the wind always ceases very near sunset, the night is very calm, and towards the morning an Easterly breeze is not unfrequently felt.

The cause of the hot winds ceasing with sunset seems to be the great depression of temperature during the night, coinciding with the Westerly direction of the wind. In consequence the wind meets, soon after sunset, with surfaces covered with a stratum of air cooled by the vicinity of the radiating surface of the ground; the hot wind passes over this stratum and is therefore not felt near the surface.

It is only during the middle, and towards the end of the hot season, that the hot winds blow till 2 or 3 o'clock in the morning, when the rains stop them suddenly.

The hour of the day at which the hot winds *commence*, is variable from the beginning to the end of the hot season. In the first months they begin to blow at 12 or perhaps 1 P. M., then the period becomes gradually earlier, till a short time before the rains they begin at 6 or 7 A. M., leaving only a few calm hours in the very early part of the morning.

The quantity of carbonic acid in the air during the hot winds is very small. It reached, in an experiment at Allyghur,* scarcely $\frac{1}{100}$ part

* The quantity of air examined was 50,000 cubic centimetres, the increase of weight of all potassium tubes reached was not a full milligramme.

in 10,000 parts of air, the ordinary quantity being 3.5 to 4 parts in 10,000.

GEOLOGICAL OBSERVATIONS.

Of the valley of the Brahmaputra, a detailed map has been prepared, showing the different soils, with observations on former levels and beds of the river, and depths from the surface deposits to the sub-soil. Different coal localities in the Bhootan Himalayas, and in the Naga Hills, have been examined and entered in this map.*.

These observations, compared with the examinations of the different soils of the Delta of the Ganges, show that the valley of the Brahmaputra differs from the Delta in being covered with lacustrine deposits, occasionally varied by the coarse gravel brought down by the Himalayan Rivers on its North-Eastern side.

The course of the actual Brahmaputra, originally flowing in the bed of the Lohit, (which was the original name used in this valley,) has not been altered by a sudden change of its bed, but has gradually shifted itself; the deposits made on the right bank (where all lacustrine soil is carried away and replaced by the actual deposits of the river) being very different from the clays on the left.

In the Himalayas, along the North-East side of the Brahmaputra, the coal is found in small seams of sand-stone alternating with strata of conglomerates of pebbles (Nageflue,) the pebbles being remarkably smaller than the deposits of the present rivers.

To these sedimentary rocks succeed, at a short distance from the banks (much shorter than in the Western Himalayas,) crystalline hornblendic rocks, chiefly hornblendic gneiss, with a peculiar linear arrangement of quartz nodules succeeding each other, when seen, in the proper section, like beads on a string.

The dip of the stratification in the sand-stones and conglomerates, which form the outer ranges of the Bhootan Himalayas, is very well defined by the alternation of the finely grained sand-stones with the conglomerates.

The dip of the strata is North 30 degrees to 40 degrees West, inclination 55 degrees to 65 degrees.

* This map, in four sheets, scale four miles to an inch, has been sent with my manuscripts to the Hon'ble the Court of Directors.

In the crystalline hornblendic rocks, the cleavage, which is well developed, dips also in the same direction. The mean direction of this dip was also found North 30 degrees to 35 degrees West, inclination 55 degrees to 60 degrees.

It is deserving of remark, that this dip of stratification and cleavage planes are quite analogous to the direction of dip in Sikkim and the Western Himalayas of Kumaon and Gurhwal. In all these parts of the Himalayas the dip of the cleavage is chiefly Northerly, varying in different parts to the East or to the West.



PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR NOVEMBER, 1856.

At a monthly general meeting of the Society held on the 5th instant, at the usual hour,

Hon'ble Sir James Colville, Knight, *President*, in the Chair.

The proceedings of the last meeting were read and confirmed.

Rájá Srishchunder Ráya Bahádoor, of Krishnagur, duly proposed and seconded at the last meeting, was balloted for and elected a member.

The election of Mr. E. A. Samuells as a Member of the Council, vice Dr. Sprenger, reported at the last meeting, was confirmed under bye-law 60.

The Council submitted the following reports :—

1st.—In reference to the Stacy collection of coins.

Report.

In a letter lately received, Captain Wroughton, on behalf of the daughters of Colonel Stacy, has offered to the Society for sale at Rs. 5,000, the valuable collection of coins and gems made by the late Colonel, a list of which has been submitted. The Council are strongly impressed with the importance of securing this fine collection, if possible, for the Society's Cabinet. They would not, however, consider it prudent to devote to this purpose so large a sum as Rs. 5,000 from the general funds of the Society, and they therefore propose that an endeavour should be made by opening a subscription among the Members to raise such a sum as will defray the whole, or a large part, of the amount necessary for the purchase.

The proposal was agreed to.

2nd.—In reference to the question of transferring the Society's Geological collections to the new Government Museum, as proposed in the letter (dated 11th July last,) from the Government of India, which was laid before the Society at the August Meeting.

Report.

The Council has to report on the proposition made by the letter from Government, dated 11th July last. It has also had under its consideration the letters from Mr. Secretary Beadou to Mr. Secretary Grey, and to Mr. Oldham of the same date, and that of Mr. Oldham to the Secretary of the Society, dated 19th July last.

The majority of the Council, consisting of the eight following Members, viz. Drs. Spilsbury, Walker and Macrae, Captain Young, Messrs. Grote and Allen, and Baboos Ramgopaul Ghose and Rájendralál Mittra, are decidedly adverse to the proposed transfer of the collections in question to the Government Museum. They conceive that such a transfer, if made, would be irreparable, that it would be inconsistent with the terms on which those collections have been acquired by, or presented to, the Society, and would be likely to injure irretrievably the future prospects of the Society.

The minority, consisting of the following six Members:—the President, Messrs. Beadou and Samuelis, Drs. Boycott and Thomson, and the Secretary, are in favour of the proposed transfer, but upon such conditions as the following:—

1st.—The separation of the Society's collections from those belonging to Government, and their identification as the property of the Society.

2nd.—The free access to and use of them by every Member of the Society in as ample a degree as he now enjoys those privileges.

3rdly.—The right to resume them should the Society be hereafter minded so to do.

These conditions, however, if this view be adopted, would have to be discussed and settled more formally between the Government and the Society.

The minority is of opinion that such a course, whilst it would secure the property of the Society, would render its collections more generally useful.

In this state of things the Council recommend, that the question should be referred to the Society at large, and that the correspondence considered by the Council, and the minutes of the different Members of Council who have expressed an opinion thereon, be circulated with the proposition.

It should further be noticed as an element in the consideration of the question, that by means of the removal of the Museum of Economic Geology, the Society has lost the services which the Curator of that Museum has heretofore rendered in the care of the Society's Geological and Mineralogical collections.

The Report was adopted.

Communications were received—

1.—From Mr. B. H. Hodgson, a paper on the Aborigines of the Nilghiris with remarks on their affinities.

2.—From Mr. Assistant Secretary Oldfield, enclosing the Meteorological Register kept at the office of the Secretary to the Government of the N. W. P., Agra, for the month of September last.

The Librarian submitted his usual monthly report.

Captain Yule read a paper, being an account of the remains of the ancient Burmese Metropolis, called Pagan, on the left bank of the Irrawaddee, 100 miles below Ava, appropriately termed by the German Geographer Ritter, "the Burman Thebaid."

A short sketch was given of the legendary history of the early Burmese monarchy, chiefly from Colonel Burney's papers in the early journals of the Society. Tagoung, above Ava, was the first seat of the Kings, to whom a sacred Indian descent is assigned. Tradition then carries the kingdom to Prome where a great city existed, before the Christian era, under the name of Thare Khet-tara (*Sri Kshetra*.) On the fall of this city an offshoot of the royal race was established at Pagan, A. D. 107.

According to Burney and Crawford this was the city of which the paper treated. But according to other authorities it was Upper or Old Pagán, adjoining Tagoung above Ava, in lat. 23° 30', where a city is still traceable, which has been visited by Colonel Hannay, Dr. Bayfield, and the Rev. Mr. Kincard; by the latter account Lower Pagán was founded about A. D. 850.

Pagán was destroyed by the Chinese in the end of the thirteenth century. The invasion is supposed to be that described by Marco Polo, as the conquest of the Kingdom of Mien, a name, it is believed, still given to Burmah by the Chinese.

Former accounts of these remains give no adequate idea of their importance and architectural magnificence.

The temples are of all kinds, but most of them are not mere *chaitiyas* or dead masses of brickwork, but hollow vaulted temples containing images of the Buddha. They are of all sizes from 20 or 30 feet square, up to more than 200 feet square; cruciform in plan, containing vaulted cells and corridors, the upper part rising in successive terraces, and crowned by a spire resembling that of the more ancient Hindoo temples in Mr. Fergusson's drawings. The number of temples remaining can scarcely be less than 1,000. They cover an area of about 8 miles by 2.

A detailed description was given of the two most prominent temples, the *Ananda* (of which the etymology is disputed, but probably *Ananta* "the endless,") and the *Thapinyu* (*servagna* "the Omniscient.")

The most singular part of the impression made by these buildings was their strong suggestiveness of resemblance in general effect to the church architecture of southern Catholic Europe.

This led to many speculations in the minds of the visitors of the possibility of European aid in their construction; but there is no good ground for deeming this possible. The first European notice of Burma is Marco Polo's, but he does not seem to speak as an eye-witness. The first traveller on record* visited Burma about A. D. 1440. These temples date from the 11th and 12th centuries.

The material is what we call in India *kucha pukka*, i. e., brick with mud cement, but covered with plaster in which the decoration is executed. We are not in India used to conceive of *kucha pukka* structures 200 feet high.

Pointed arches and vaults, doorways surmounted by pediments of singular flamboyant spires or horns, decorated pilasters of an almost perfect Roman character, friezes of festoons of beads suspended by tusked and grinning heads, are some of the characteristics of the architecture. In one temple flat brick arches beautifully executed were disclosed by the decay of the plaster.

Many of the details of the ornament were shown to be found in Indian buildings in the South of the Peninsula, in Central India, in Assam, in Sarnath near Benares, in the temples of Orissa, and in the great Javanese remains described by Raffles.

* Nicolo da Conti.

But where should we find in India any model of the composition? Where anything approaching the classical beauty of decoration in some of the smaller temples, and the stupendous architectural majesty of the larger?

Perhaps the nearest analogy in form is found in the rock-cut *Raths* of Mahabalipooram near Sadras.

The paper was read in explanation of about five and twenty illustrations, partly kalotypes by that accomplished photographer Captain Tripe of the Madras Army, and partly drawings, plans, elevations, sections and details on a large scale, prepared by Captain Yule, from measurements made on the spot with the kind aid of Mr. Oldham and Lieutenant Heathcote of the Indian Navy.

On the motion of the President the thanks of the meeting were voted by acclamation to Captain Yule for his very interesting paper.

Mr. Oldham gave notice that at the next meeting he would move that for rule 8 of the Society's rules the following be substituted.

Ordinary members shall be divided into two classes, Residents and non-Residents. All members who may live in Calcutta, or within any distance thereof, not exceeding 12 miles, for any portion of the year exceeding three months, shall be considered Resident members. All members who may reside permanently at a greater distance, or who may only occasionally visit Calcutta for periods shorter than three months, shall be considered non-Resident members.

Ordinary members "Residents" shall pay an admission fee of 32 Rs. and an annual subscription of 64 Rs., payable in advance, annually or quarterly. Non-Resident members shall pay an admission fee of 32 Rs. payable in advance, quarterly or annually.

Non-Resident members who may subsequently become Residents, shall be liable to the advanced rate of subscription from the first day of the quarter, next succeeding their change of residence, and in the same manner Resident members who may become non-Residents shall be entitled to the reduction in their subscriptions.

LIBRARY.

THE Library has received the following accessions during the month of October last.

Presented.

The White Yajurveda, edited by A. Weber, Part II. No. 8, 1855, Royal 4to.—BY THE EDITOR.

The Anvâr-i Suhailî; or, the Lights of Canopus; being the Persian version of the Fables of Pilpay; or, the book “Kalilah and Damnah,” literally translated by E. B. Eastwick, Hertford, 1854, Royal 8vo.—BY THE TRANSLATOR.

A Table of Synchronisms: compiled by E. Clibborn, with an Essay on the Probability of Saul, Beniah, &c. having been the Hycsos Rulers, Salatis, &c. Dublin.—BY THE AUTHOR.

Journal of the Statistical Society of London, Vols. 9 to 18, from 1846 to 1855, and part 2 of Vol. 19, June, 1856.

Sanskrit—Wörterbuch herausgegeben von der kaiserlichen akademie der Wissenschaften, bearbeitet von Otto Böhtlingk und Rudolph Roth, Bogen, 11-20, 21-30, 31-40. *St. Petersburg*, 1853 and 1854.—BY THE EDITORS.

Philosophical Transactions of the Royal Society of London, for the year 1855, Vol. 145, Parts I. and II. A List of Members.—BY THE SOCIETY.

Proceedings of the Royal Society, Vol. VII. Nos. 14, 15 and 22.—BY THE SAME.

The Transactions of the Royal Irish Academy, Vol. XXII. Part VI. *Dublin*.—BY THE SOCIETY.

Proceedings of the Royal Irish Academy, for the years 1854-55, Vol. 6, Part 2nd, two copies.—BY THE SOCIETY.

Indische Studien, Beiträge für die Kunde des indischen Alterthums, von Dr. A. Weber, Dritten Band Zweites und Drittes Heft, 4 copies and Dritter Band, 1 copy.—BY DR. A. WEBER.

Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, von Karl Kreil, Band III. January 1851, *Wien*, 1855.—BY THE IMPERIAL ACADEMY OF VIENNA.

Denkschriften der Kaiserlichen Akademie der Wissenschaften, Philosophisch-Historische Classe. Sechster Band.—BY THE SAME.

Ditto, Ditto, Mathematisch-Naturwissenschaftliche Classe, Neunter Band.—BY THE SAME.

Almanach, ditto, 1855, ditto.—BY THE SAME.

Sitzungsberichte der ditto ditto, Band VIII. Heft 4 and 5.—BY THE SAME.

Ditto IX. Heft 2 and 2.—BY THE SAME.

Sitzungsberichte der ditto ditto, Band XV. Heft 3.—BY THE SAME.

————— Ditto XVI. Heft 1 and 2.—BY THE SAME.

————— Ditto XVII. Heft 1—3.—BY THE SAME.

————— Ditto Ditto, Philosophisch Historische

Classe.—BY THE SAME.

————— Ditto VIII. Heft 3, 4 and 5 in one.—BY THE SAME.

————— Ditto IX. Heft 1 and 2.—BY THE SAME.

————— Ditto XV. Heft 2 and 3.—BY THE SAME.

————— Ditto XVI. Heft 1 and 2.—BY THE SAME.

————— Ditto XVII. Heft 1 and 2.—BY THE SAME.

Archiv für Kunde österreichischer Geschichtsquellen, Band XIV. Heft 2 and Band XV. Heft 1.—BY THE SAME.

Monumenta Habsburgica. Sammlung von Actenstücken und Briefen zur Geschichte des Hauses Habsburg in dem Zeitraume. von 1473 bis 1576, Zweiter Band Erste Abtheilung.—BY THE SAME.

Notizenblatt 1855, Nos. 13 to 24.—BY THE SAME.

Die Feierliche Sitzung der ditto, am 29 Mai, 1852 Wein.—BY THE SAME.

Fontes Rerum Austriacarum. Oesterreichische Geschichtsquellen 1 Band, Erste Abtheilung, VIII. Band, Zweite Abtheilung, and IX. Ditto, Ab. ditto.—BY THE SAME.

“The Discovery of America by the Northmen and the Connection of the Northmen with the East,” 20 sheets.—BY THE ROYAL SOCIETY OF ANTIQUARIES OF NORWAY.

Mémoires de la Société Royale des Antiquaires du Nord, 1848-49, *Copenhagen*, 2 copies.—BY THE SAME.

Antiquarisk Tidsskrift, Udgivet af det Kongelige Nordiske Oldskrift-Selskab. 1849-1851 and 1852-1854.—BY THE SAME.

Remarks on a Danish Runic Stone from the eleventh century, found in the central part of London. By C. C. Rafn.—BY THE SAME.

Bijdragen tot de Taal-land-En Volkenkunde van Neêrlandsch Indië, Derde Deel, and Vierde Deel, Nos. 1 en 2.—BY THE ROYAL INSTITUTE OF HISTORY, GEOGRAPHY AND ETHNOLOGY OF NETHERLANDS, INDIA.

Mémoire sur la Reproduction Imprimée des caractères de l'Ancienne E'criture Démotique des E'gyptiens, par H. Brugsch, *Berlin*, 1855.

Selections from the Public Correspondence of the Punjaub Administration, Vol III. No. II. 1856, 4 copies.—BY THE PUNJAUB GOVERNMENT.

The Quarterly Journal of the Geological Society, Vol. 12, No. 47, Part 3, August, 1856.—BY THE SOCIETY.

Proceedings of the Anniversary Meeting of the Royal Geographical Society, No. 5.—BY THE SOCIETY.

Mr. David Smith's Report on the Coal and Iron Distriets of Bengal.—BY THE GOVERNMENT OF BENGAL.

Entomological Papers, Nos. 2 and 3, July and August, 1856.—BY JOHN NEITNER, THE EDITOR.

Natuurkundig Tijdschrift voor Nederlandseh Indië, Deel XI. Derde Serie, Deel I. Af. 4, 5 og 6.—BY THE NATURAL HISTORY SOCIETY OF NETHERLAND'S INDIA.

The Durbin Newspaper, for October, 1856.—BY THE EDITOR.

The Phoenix Newspaper, for ditto.—BY THE EDITOR.

The Morning Chroniele, for ditto.—BY THE EDITOR.

Exchanged.

The Athenæum, for August, 1856.

The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science, No. 78, for September, 1856.

Purchased.

The Literary Gazette, Nos. 25 to 29.

L'Athenæum français, Nos. 27 and 30.

Ditto Indien, January to July, 1856.

Revue Des Deux Mondes, 15th August and 1st September, 1856.

Comptes Rendus, Nos. 3 to 6, July and August, 1856.

Tables des Comptes Rendus, Deuxieme Semestre, 1855, Tome 41.

Annales des Sciences Naturelles, No. 1, Tome V.

Revue et Magasin de Zoologie, No. 7 of 1856.

Revue Contemporaine des Athenæum Franeais, 15th and 31st August, 1856.

Popular Astronomy, by F. Arago, translated by Admiral Smyth, and Robert Grant, in 2 volumes, *London*, 1855, 8vo. 1 vol.

Meteorological Essays, by F. Arago. With an Introduction by Baron Alexander von Humboldt. Translated under the superintendence of Col. Sabine, *London*, 1855, 8vo.

Odontology; or, a Treatise on the Comparative Anatomy of the Teeth; their physiological relations, mode of development, and microscopie structure, in the Vertebrate Animals. By R. Owen, *London*, 1840-1845, in 2 vols. Royal 8vo. Vol. 2nd contains an Atlas of 168 plates.

The Expedition for the Survey of the Rivers Euphrates and Tigris, carried on by order of the British Govt. in the years 1835, 1836 and 1837. By Lieut.-Col. Chesney: vols. 1st, 2nd, and 3rd, Royal 4to. *London*, 1850.

The Geography of Herodotus, by J. T. Wheeler, *London*, 1854, 8vo.

Quarterly Journal of Microscopical Science: including the Transactions of the Microscopical Society of London. *London*, Nos. 1 to 15, Oct. 1852 to April 1856.

The Geography of Strabo, translated by H. C. Hamilton and Dr. W. Falconer, in 3 vols. *London*, 1854, Royal 12mo. 2 vols.

The Mahāvira Charita, or the History of Rāma, a Sanskrit play by Bhatta Bhavabhūti, edited by F. H. Trithen. *London*, 1848, Royal 8vo.

The Dasakumāra Charita, or Adventures of ten Princes. A Series of Tales in Original Sanskrit, by Sri Daṇḍī, edited by H. H. Wilson. *London*, 1846, Royal 8vo.

Bhagavad-Gītā; or the Sacred Lay: a colloquy between Krishna and Arjuna on Divine matters: an episode from the Mahābhārata, with the title श्रीभगवद्गोता ब्रह्मविद्या योगशास्त्रं श्रीकृष्णार्जुनसंवादः। By J. C. Thomson. *Hertford*, 1855, 8vo. Royal 12mo.

Biblisches Realwörterbuch zum handgebrauch für studirende, candidaten, Gymnasiallehrer und prediger ausgearbeitet, von Dr. G. B. Winer. *Leipzig*, 1847, Erster Band, A.—K. Royal 8vo.

Sākuntalā; a Sanskrit Drama, in seven Acts, by Kālidāsa;—the Devanāgarī recension of the text now for the first time edited in England, with literal translations of all the metrical passages, &c., by M. Williams. *Hertford*, 1853, Royal 8vo.

Arabum Proverbia, by G. W. Freytag, Tom. III. *Bonn*, 1843.

Histoire générale et Système comparé des Langues Sémitiques, par E. Renan, Part I. *Paris*, 1855, Royal 8vo.

Alphabets of all Nations, 2 sheets folio, 1 copy.

Natural History Review, from January, 1854 to April, 1856, 10 Nos.

Lexiologie Indo-Européenne ou Essai sur la Science des Mots Sanskrits, Grecs, Latins, Français, Lithuaniens, Russes, Allemands Anglais, &c. par. H—J. Chavée. *Paris*, 1849, 8vo.

Vergleichungs-Tabellen der Muhammedanischen und Christlichen Zeitrechnung; von Dr. Ferdinand Wüstenfeld. *Leipzig*, 1854, 4to.

Description of a Planispheric Astrolabe constructed for Shāh Sultan Husain Safawī, King of Persia, and now preserved in the British Museum; by W. H. Morley, Royal Folio. *London*, 1856.

GOUR DOSS BYSACK,

Librarian and Asst. Secy.

The 1st November, 1856.

FOR DECEMBER, 1856.

At a Monthly General Meeting of the Society held on the 3rd instant, at the usual hour.

The Venerable Archdeacon John H. Pratt, senior member present, in the Chair.

The proceedings of the last meeting were read and confirmed.

Presentations received—

1st.—From the Government of India, at the request of Captain Yule, a copy of his narrative of the mission to the Court of Ava.

The thanks of the meeting were voted to Captain Yule for his good offices in obtaining for the Society, this interesting and valuable addition to its Library.

2d. From Capt. W. S. Sherwill, F. G. S., a series of specimens from the Borrowdale Plumbago Mine in Cumberland, collected by him on the spot, consisting of—

1. Slaty rock (upper Silurian) from Borrowdale, 500 feet below the Greenstone Porphyry, containing the Plumbago carburet of iron.

2. Greenstone containing iron pyrites (sulphuret of iron) found in close proximity to the plumbago.

3. Greenstone porphyry discoloured with oxide of iron, the red oxide is considered by the miners as a sure index and guide to the presence of plumbago.

4. The red oxide is here shown in conjunction with the plumbago, the plumbago having been forced into narrow crevices in the greenstone rock, the mineral bearing marks or striæ caused by friction.

5. The plumbago in small nests embedded in greenstone porphyry.

6. Greenstone porphyry strongly impregnated with plumbago.

7. Tolerably pure plumbago. The striæ where it lay against the containing rock are still visible upon its surface.

8. Specimens dug from a nest of plumbago that was found embedded in greenstone porphyry (No. 6.) This quality is used in the manufacture of lead pencils.

9. Plumbago of divers degrees of purity and value, also used for pencils.

10. The purest specimens of plumbago obtainable, valued £30 a ton.

11. Inferior quality plumbago as prepared for polishing iron; price one penny.

Capt. Sherwill also exhibited to the meeting a series of specimens from the strata pierced in boring the Puits de Grenelle or the great artesian well at Paris which now supplies $\frac{1}{4}$ of Paris with water brought from a depth of 547 metres equal to 1,686 feet.

On the proposition of the Chairman, the thanks of the meeting were voted to Capt. Sherwill for the valuable specimens presented to the Society.

A note from Mr. G. F. Edmonstone, intimating his wish to withdraw from the society, was recorded.

In pursuance of the notice given at the last meeting, Mr. Oldham moved.

"That for rule 8 of the Society's rules, the following be substituted, *viz.*

"Ordinary members shall be divided into two classes, residents and non-residents. All members who may live in Calcutta, or within a distance thereof not exceeding 12 miles for any portion of the year exceeding three months, shall be considered resident-members. All members who may reside permanently at a greater distance, or who may only occasionally visit Calcutta for periods shorter than three months, shall be considered non-resident members.

"Ordinary members, *residents*, shall pay an admission fee of 32 Rs., and an annual subscription of 64 Rs. payable in advance annually or quarterly; *non-resident members* shall pay an admission fee of 32 Rs., and an annual subscription of 32 Rs. payable in advance quarterly or annually.

"Non-resident members who may subsequently become residents, shall be liable to the advanced rate of subscription from the first day of the quarter next succeeding their change of residence, and in the same manner resident members who may become non-residents, shall be entitled to the reduction in their subscriptions."

The proposition was referred to the Council for report in accordance with rule 45.

Communications were received—

1. From Mr. Assistant Secretary Oldfield, enclosing copy of a meteorological register kept at the office of the Secretary to the Government of the N. W. P. Agra, for the month of Sept. last.

3. From Mr. J. Nietner, some additional papers on the Coleoptera of Ceylon.

4. From Messrs. Hermann and Robert Schlagintweit, copy of a report on the progress of the Magnetic Survey from July to September last, being an account of a journey across the chain of the Koenluen from Ladak to Khotan.

The Librarian submitted his usual monthly report.

Mr. H. F. Blanford called the attention of the meeting to a series of fossils from the nummulitic rocks of Scinde, which had been found among the boxes belonging to the Government Museum of Economic Geology and had since been arranged and examined. These were now on the table. The Geological Survey were also indebted to Colonel Baker for kindly presenting to their collection a few species of which the original collection did not contain examples.

The collection consisted of 247 species, viz.:

	Species.
Mammalian Bones,	1 ?
Fish teeth,	1
<i>Cephalopoda.</i>	
Nautili,	2
<i>Gasteropoda,</i>	
Strombidæ,	9
Muricidæ,	26
Buccinidæ,	10
Conidæ,	6
Volutidæ,	8
Cypræidæ,	8
Naticidæ,	9
Cerithiadæ,	10
Turritellidæ,	10
Littorinidæ,	3
Turbinidæ,	4
<i>Lamelli-branchiata.</i>	
Ostreidæ,	20
Mytilidæ,	4
Arcadæ,	9
Chamidæ,	4
Cardiadæ,	6

Succinidæ,	9
Cyprinidæ,	16
Veneridæ,	18
Anatinidæ,	1
Pholadidæ,	1
<i>Bryozoa.</i>	
Discoflustrella,	1
<i>Annelidæ.</i>	
Serpulidæ,	2
<i>Crustacea.</i>	
Balanidæ,	2?
Brachyura,	3
<i>Echinoidea.</i>	
Echinidæ,	9
Cidaritidæ,	1
Clypeasteridæ,	1
Cassidulidæ,	2
Spatangidæ,	5
<i>Polypiaria.</i>	
Helianthoida,	16
Rhizopoda,	10
<i>Summary.</i>	
Vertebrata,	2?
Mollusca,	194
Articulata,	7
Radiata,	34
Protozoa,	10
<hr/>	
Total,	247 species.
<hr/>	

Of the above species not more than 143 have been identified as known forms described and figured in the works of M. M. D'Archiac, Deshayes, and J. de C. Sowerby.

It is not, however, probable that the whole of the remaining species are new, and of the thirteen species of corals as yet not identified, the majority may possibly be found described in the works of M. M. Milne Edwardes and Haime. Further comparison may, moreover,

shew that some few other species have been described as occurring in rocks of the Eocene age in Europe, though new to the nummulitic rocks of India, but allowing for such possible identifications, it is probable that a very large proportion, amounting to not less than one-fourth of the whole collection, are new and undescribed forms. As considerable collections of nummulitic fossils from Scinde and Cutch have been previously described and figured by Messrs. Sowerby and D'Archiac, this is a striking fact, and indicates a richness in the fauna of the nummulitic rocks of Scinde, probably not much inferior to that of the Paris Eocenes.

The general *facies* of the fossils in the present collection is that of a moderate depth of water, probably not exceeding 40 fathoms or the equivalent of the Coralline Zone as defined by the late Professor E. Forbes. It would be extremely interesting to institute a comparison between the nummulitic fauna of Scinde and that of the Indian Ocean at the present day, since so far as can be judged from the collections of shells brought from Kurrachee by Col. Baker, a great generic resemblance exists between the two series, but until more detailed investigations of the marine life of the Indian Ocean have been made, and the results of dredgings at different depths placed on record, such a comparison would be premature.

Mr. Oldham gave a brief sketch of the nature and extent of the nummulitic rocks in India, prefacing his remarks by a notice of the distribution of Nummulites in the geological series of Europe. The group was traced from Persia in the west, through Cutch, Scinde Beloochistan, the Salt Range, Nainee Tal district, Sikkim, the Khasi Hills, to the Irrawaddee in the East, the peculiar features in each being represented on sections exhibited to the meeting. With considerable local variation as might naturally be anticipated, there was a constancy in the general succession, and a remarkable constancy in the organic remains.

Some general conclusions bearing on the geological age of these rocks were referred to; and the utter impossibility of any sound results being arrived at without a full knowledge of the organic remains of such deposits insisted upon.

On the motion of the chairman, the thanks of the meeting were voted by acclamation to Mr. Blanford and Mr. Oldham, for their very valuable and interesting communications.

LIBRARY.

The Library has received the following accessions since the last meeting.

Presented.

Report of the Mission to Ava. By Capt. Yule, Folio.

Homer's Iliad, 8vo. (an old copy).—BY MR. THEOBALD, *Junior*.

An Appendix to Report of the Committee for Scientific Inquiries in Relation to the Cholera-Epidemic of 1854.—BY THE SAME.

Selections from the Public Correspondence of the Punjab Administration, Vol. III. No. 3, 1856, 4 copies.—BY THE PUNJAB GOVERNMENT.

General Report on Public Instruction in the Lower Provinces of the Bengal Presidency, for 1855-56.—BY THE BENGAL GOVERNMENT.

Abhandlungen der Philosoph-Philologischen classe der Koenigl. Bayrischen Akademie der Wissenschaften, *München*, Royal 4to. pamphlet, Vol. VII. Parts 2nd and 3rd.—BY THE ACADEMY.

————— der Historischen classe der ditto, 1855, *München*, Royal 4to. Vol. VII. Part 3.—BY THE SAME.

Gelehrte Anzeigen, *Munich*, Vols. 40 and 41, January to December, 1855.—BY THE SAME.

Almanac for 1855.—BY THE SAME.

Fried, W. J. Schelling, Denkrede, von Dr. Beckters. Pamphlet.—BY THE SAME.

Denkrede auf die Akademi ker Dr. Thaddäus Siber und Dr. G. Simon Pym, von Dr. Eamont. Pamphlet.—BY THE SAME.

Dr. Lorenz Hubner's Biographische Charakteristik, von J. Wismayr. Pamphlet.—BY THE SAME.

Ueber Die Gliederung der Bevölkerung, des Königreichs Bágern, von Dr. F. T. W. Herman. Pamphlet.—BY THE SAME ACADEMY.

Proceedings of the Royal Society of Edinburgh, for 1855-56, Vol. III. No. 46.—BY THE SOCIETY.

Transactions of the Royal Society of Edinburgh, Vol. XXI. Part III. for the session 1855-56.—BY THE SAME.

Proceedings of the Royal Society, Vol. VII. No 15, Vol. VIII. No. 22.—BY THE ROYAL SOCIETY.

Journal Asiatique, Tome VII. No. 28, *Juin*, 1856.—BY THE ASIATIC SOCIETY OF PARIS.

Journal of the Proceedings of the Linnean Society, Vol. I. Nos. 1 and 2.—BY THE SOCIETY.

Address of Thomas Bell, President, at the Anniversary of the Society.—BY THE SAME.

Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Lithuanischen, Altslavischen, Gothischen und Deutschen, von F. Bopp. Erster Band Erste Helfte. *Berlin*, 1856, 8vo.—BY THE AUTHOR.

Grammatik der Huzvâreschsprache von F. Spiegel. *Wein*, 1856, 8vo.—BY THE AUTHOR.

Journal of the Statistical Society of London, Vol. XIX. Part III.—BY THE SOCIETY.

The Oriental Christian Spectator, for October, 1856.—BY THE EDITOR.

The Calcutta Christian Observer, for November, 1856.—BY THE EDITORS.

The Oriental Baptist, for November, 1856.—BY THE EDITOR.

The Upâdeshák, for November, 1856.—BY THE EDITOR.

The Durbin Newspaper, for November, 1856.—BY THE EDITOR.

The Phœnix ditto, for ditto.—BY THE EDITOR.

The Morning Chronicle ditto, for ditto.—BY THE EDITOR.

The Tuttwabodhini Putrika, for November, 1856.—BY THE EDITOR.

The Central Star, for ditto.—BY THE EDITOR.

Exchanged.

The Athenæum, for September, 1856.

The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Sciences, No. 79, for October, 1856.

Purchased.

Hewitsoni Exotic Lepidoptera, Nos. 1 to 18, *pamphlets*.

The Literary Gazette, Nos. 30 to 33.

Revue Contemporaine et Athenæum Français, Nos. 107 and 108, for September, 1856.

The Annals and Magazine of Natural History, for October, 1856.

The American Journal of Science and Arts, No. 65, September, 1856.

The Natural History Review, No. XII. October, 1856.

Comptes Rendus, Nos. 7 to 11, for August and September, 1856.

Revue et Magasin de Zoologie, No. 8, 1856.

Journal des Savants, for August, 1856.

Revue des Deux Mondes, 15th Sept. and 1st Oct. 1856, 2 3 Nos.

Annales des Sciences Naturelles, Tome V. No. 3.

The Westminster Review, No. XX. for October, 1856.

The Edinburgh Review, No. 212, ditto.

The Quarterly Review, No. CXCVIII. September, 1856.

GOURDOSS BYSA'CK,

Librarian and Asstt. Secy.

The 1st Dec., 1856.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1856.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.
Height of the Cistern of the Standard Barometer above the level of the Sea, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	<i>Sunday.</i>							
2	.29.623	29.704	29.577	0.127	81.5	86.2	77.2	9.0
3	.682	.733	.624	.109	83.1	87.6	79.2	8.4
4	.673	.745	.584	.161	83.1	88.2	79.8	8.4
5	.643	.688	.571	.117	82.8	86.4	80.0	6.4
6	.606	.658	.526	.132	83.3	89.0	79.8	9.2
7	.537	.598	.469	.129	82.6	86.4	79.7	6.7
8	<i>Sunday.</i>							
9	.592	.650	.511	.139	84.0	91.6	80.0	11.6
10	.590	.636	.518	.112	83.2	88.4	80.2	8.2
11	.601	.649	.538	.111	83.2	86.2	80.9	5.3
12	.526	.599	.421	.178	83.8	89.8	80.4	9.4
13	.417	.467	.359	.108	84.9	90.2	81.2	9.0
14	.401	.476	.352	.124	83.7	87.7	80.0	7.7
15	<i>Sunday.</i>							
16	.450	.502	.406	.096	81.5	84.4	79.8	4.6
17	.447	.487	.381	.106	82.7	89.8	79.0	10.8
18	.497	.571	.448	.123	83.6	89.0	79.2	9.8
19	.548	.593	.500	.093	81.9	86.6	76.4	10.2
20	.552	.610	.491	.119	83.6	88.1	75.8	12.3
21	.589	.631	.547	.084	85.1	91.7	79.7	12.0
22	<i>Sunday.</i>							
23	.516	.571	.442	.129	86.2	91.7	81.8	9.9
24	.471	.515	.430	.085	82.7	88.4	80.4	8.0
25	.507	.553	.461	.092	82.3	83.8	81.0	2.8
26	.513	.565	.462	.103	79.9	81.8	77.8	4.0
27	.540	.590	.490	.100	83.0	89.6	78.0	11.6
28	.574	.623	.523	.100	85.5	91.0	81.4	9.6
29	<i>Sunday.</i>							
30	.527	.587	.464	.123	85.5	91.8	82.2	9.6

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Va- pour required for com- plete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	<i>Sunday.</i>							
2	78.7	2.8	77.3	4.2	0.919	9.90	1.41	0.88
3	79.4	3.7	77.5	5.6	.925	.92	.94	.84
4	79.4	3.7	77.5	5.6	.925	.92	.94	.84
5	79.8	3.0	78.3	4.5	.949	10.18	.57	.87
6	80.0	3.3	78.3	5.0	.949	.18	.75	.85
7	79.7	2.9	78.2	4.4	.946	.17	.51	.87
8	<i>Sunday.</i>							
9	80.2	3.8	78.3	5.7	.949	.16	2.01	.84
10	80.1	3.1	78.5	4.7	.955	.25	1.64	.86
11	80.3	2.9	78.8	4.4	.964	.36	.53	.87
12	80.7	3.1	79.1	4.7	.973	.42	.68	.86
13	82.0	2.9	80.5	4.4	1.017	.89	.60	.87
14	81.3	2.4	80.1	3.6	.005	.75	.32	.89
15	<i>Sunday.</i>							
16	79.4	2.1	78.3	3.2	0.949	.22	.09	.90
17	79.4	3.3	77.7	5.0	.931	.00	.72	.85
18	80.2	3.4	78.5	5.1	.955	.25	.78	.85
19	79.7	2.2	78.6	3.3	.958	.32	.12	.90
20	80.3	3.3	78.6	5.0	.958	.28	.75	.86
21	81.0	4.1	78.9	6.2	.967	.34	2.23	.82
22	<i>Sunday.</i>							
23	81.7	4.5	79.4	6.8	.983	.47	.52	.81
24	80.1	2.6	78.8	3.9	.964	.36	.36	.88
25	79.9	2.4	78.7	3.6	.961	.33	1.25	.89
26	78.3	1.6	77.5	2.4	.925	.00	0.78	.93
27	79.1	3.9	77.1	5.9	.913	9.80	2.02	.83
28	81.3	4.2	79.2	6.3	.976	10.43	.29	.82
29	<i>Sunday.</i>							
30	81.9	3.6	80.1	5.4	1.005	.73	1.99	.84

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.561	29.704	29.412	0.292	81.4	83.8	77.2	6.6
1	.550	.697	.389	.308	81.1	83.6	77.6	6.0
2	.541	.679	.382	.297	81.0	83.4	77.8	5.6
3	.532	.677	.361	.316	80.7	83.0	78.2	4.8
4	.531	.681	.365	.316	80.4	83.0	76.4	6.6
5	.537	.675	.352	.323	80.2	82.2	76.8	5.4
6	.557	.693	.376	.317	80.4	82.8	77.0	5.8
7	.570	.725	.413	.312	81.2	83.6	77.0	6.6
8	.581	.740	.436	.304	82.7	86.0	77.0	9.0
9	.584	.739	.421	.318	84.1	87.2	77.8	9.4
10	.585	.745	.417	.328	84.8	88.7	75.8	12.9
11	.576	.726	.407	.319	85.7	90.2	78.6	11.6
Noon.	.561	.702	.389	.313	86.1	91.6	79.2	12.4
1	.543	.674	.386	.288	86.7	91.8	79.0	12.8
2	.522	.647	.369	.278	86.8	91.7	79.4	12.3
3	.505	.626	.368	.258	86.6	91.7	80.1	11.6
4	.494	.625	.359	.266	86.0	91.6	80.2	11.4
5	.488	.624	.360	.264	85.4	89.4	80.4	9.0
6	.499	.635	.368	.267	84.5	87.6	80.4	7.2
7	.518	.659	.370	.289	83.6	86.2	79.0	7.2
8	.541	.692	.392	.300	83.0	85.2	78.8	6.4
9	.557	.702	.420	.282	82.5	85.2	78.2	7.0
10	.570	.724	.424	.300	82.1	85.2	78.0	7.2
11	.570	.714	.424	.290	81.9	84.2	77.8	6.4

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of Air.	Additional weight of va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.4	2.0	78.4	3.0	0.952	10.25	1.02	0.91
1	79.3	1.8	78.4	2.7	.952	.25	0.92	.92
2	79.2	1.8	78.3	2.7	.949	.22	.92	.92
3	79.0	1.7	78.1	2.6	.943	.16	.88	.92
4	78.9	1.5	78.1	2.3	.943	.18	.76	.93
5	78.7	1.5	77.9	2.3	.937	.12	.76	.93
6	78.9	1.5	78.1	2.3	.943	.18	.76	.93
7	79.4	1.8	78.5	2.7	.955	.29	.92	.92
8	80.2	2.5	78.9	3.8	.967	.39	1.33	.89
9	80.7	3.4	79.0	5.1	.970	.40	.81	.85
10	80.6	4.2	78.5	6.3	.955	.23	2.23	.82
11	80.8	4.9	78.3	7.4	.949	.14	.66	.79
Noon	81.1	5.0	78.6	7.5	.958	.21	.74	.79
1	81.5	5.2	78.9	7.8	.967	.30	.88	.78
2	81.4	5.4	78.7	8.1	.961	.24	.97	.78
3	81.3	5.3	78.6	8.0	.958	.21	.93	.78
4	81.1	4.9	78.6	7.4	.958	.23	.68	.79
5	81.1	4.3	78.9	6.5	.967	.32	.36	.81
6	80.7	3.8	78.8	5.7	.964	.31	.04	.84
7	80.5	3.1	78.9	4.7	.967	.37	1.66	.86
8	80.0	3.0	78.5	4.5	.955	.25	.57	.87
9	79.9	2.6	78.6	3.9	.958	.30	.34	.89
10	79.8	2.3	78.6	3.5	.958	.30	.21	.90
11	79.8	2.1	78.7	3.2	.961	.35	.09	.91

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1856.*
Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches		
1	Sunday.	0.88		Cloudless till 3 A. M. cloudy afterwards,
2	109.0	0.32	E. or S. E.	[with some rain before and after sunrise.
3	128.0	0.11	S. E. or E.	Cloudless till 3 A. M. cloudy afterwards.
4	..	..	S. E. or E. or S. W.	Cloudy. [Also little rain at 1 P. M.
5	..	0.11	E.	Cloudless till 4 A. M. cloudy afterwards,
6	..	..	E.	[also drizzling at 11 A. M. and 9 P. M.
7	..	0.70	E. or N. E.	Cloudless till 6 A. M. cloudy afterwards,
8	Sunday.	0.18		[Also little drizzling at 11 A. M.
9	125.0	0.10	E. or N. E. or S. E.	Cloudless till 5 A. M. scattered ☁ or ☁
10	118.0	0.42	S. E.	afterwards, also a shower of rain between Noon and 1 P. M.
11	..	..	S. E.	[afterwards, also rain at 4 & 8 P. M.
12	110.0	0.16	S. E.	Cloudless till 3 A. M., scattered ☁ & ☁
13	..	0.08	S. or S. E.	Cloudless till 5 A. M., cloudy afterwards,
14	..	0.26	S. E.	[also rain between 7 & 8 A. M.
15	Sunday.	1.12		Cloudy, also drizzling at Noon.
16	..	0.66	S. or S. W.	Cloudless till 2 A. M. cloudy afterwards,
17	121.0	0.16	S. or S. W.	[also rain between 1 & 2 P. M.
18	..	1.05	S. W. or S.	Cloudy, also little drizzling between 3
19	..	1.20	E. or S. E.	[& 4 A. M.
20	109.0	0.52	S. E. or E.	Cloudy with rain at 10 & 11 P. M.
21	124.4	..	S. E. or S.	
22	Sunday.	1.12		[also raining between 6 & 7 P. M.
23	130.0	..	S.	Cloudy and drizzling from 7 to 9 A. M.,
24	120.4	2.08	S. E. or S.	Cloudy, also after 4 P. M. much thunder
25	..	0.22	S. or S. W.	[and lightning and some rain.
26	..	2.34	S. or S. E.	Cloudy, also a heavy shower of rain at
27	114.0	..	S. or S. E.	[8 P. M.
28	122.0	..	S. E. or S.	Cloudy till 4 P. M. with much thunder &
29	Sunday.	..		rain before sunrise, scat. ☁ & ☁ after
30	121.0	..	S. E.	Cloudless till 7 A. M., cloudy till 7 P. M.,
				with rain at 10 A. M. cloudless after
				7 P. M.
				Cloudless till 11 A. M. scattered clouds
				[afterwards.
				Cloudy.
				Cloudy with rain from 12 to 2 P. M.
				Cloudy with rain at 11 A. M.
				Cloudy with much rain between 9 A. M.
				Scattered clouds. [& 2 P. M.
				Cloudless till 3 A. M., cloudy till 7 P. M.,
				[cloudless afterwards.
				[wards.
				Cloudless till 4 A. M., scatd. ☁ after-

☁ Cirri, ☁ cirro strati, ☁ cumuli, ☁ cumulo strati, ☁ Nimbi, ☁ strati, ☁ cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer for the month,	..	....	29.545
Max. height of the Barometer, occurred at 10 A. M. on the 4th,		....	29.745
Min. height of the Barometer, occurred at 5 A. M. on the 14th,		....	29.352
Extreme range of the Barometer during the month,	..	....	0.393

			°
Mean Dry Bulb Thermometer for the month,	..	....	83.3
Max. Temperature, occurred at 1 P. M. on the 30th,	..	....	91.8
Min. Temperature, occurred at 4 A. M. on the 19th,	..	....	76.4
Extreme range of the Temperature during the month,	..	....	15.4

Mean Wet Bulb Thermometer for the month,	..	....	80.2
Mean Dry Bulb Thermometer, above Mean Wet Bulb Thermometer,		....	3.1
Computed Mean Dew Point for the month,	..	....	78.6
Mean Dry Bulb Thermometer, above computed Mean Dew Point,	..		4.7
			Inches.
Mean elastic force of vapour for the month,	..	....	0.958
			Troy grains.
Mean weight of vapour for the month,	..	....	10.28
Additional weight of vapour, required for complete saturation.		....	1.65
Mean degree of Humidity for the month, complete saturation being unity,			0.86
			Inches.
Rained 22 days. Max. fall of Rain during 24 hours,	..	....	2.34
Total amount of rain during the month,	..	....	12.67

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July, 1856.*

Latitude 22° 33' 1" North, Longitude 88° 20' 34" East.

Height of the cistern of the Standard Barometer above the Level of the Sea 18.11. feet.

Daily Means, &c. of the Observations, and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.515	29.553	29.455	0.098	84.2	87.6	81.8	5.8
2	.517	.561	.451	.110	84.0	87.8	81.2	6.6
3	.549	.612	.496	.116	84.7	90.7	81.2	9.5
4	.596	.643	.546	.097	84.6	90.2	82.0	8.2
5	.594	.631	.544	.087	85.2	90.4	81.2	9.2
6	<i>Sunday.</i>							
7	.582	.630	.535	.095	84.9	90.0	82.2	7.8
8	.558	.625	.484	.141	84.0	91.7	78.0	13.7
9	.558	.598	.521	.077	81.0	85.9	77.9	8.0
10	.512	.579	.449	.130	81.7	87.5	79.4	8.1
11	.448	.507	.371	.136	83.0	88.0	79.0	9.0
12	.471	.539	.429	.110	84.5	87.4	81.8	5.6
13	<i>Sunday.</i>							
14	.511	.560	.454	.106	83.7	89.2	81.2	8.0
15	.476	.523	.397	.126	84.0	89.0	80.0	9.0
16	.423	.473	.354	.119	84.3	88.6	82.0	6.6
17	.418	.452	.367	.085	82.6	85.3	79.7	5.6
18	.439	.502	.376	.126	78.7	80.2	76.9	3.3
19	.469	.512	.407	.105	80.9	85.4	77.4	8.0
20	<i>Sunday.</i>							
21	.373	.435	.316	.119	83.2	88.6	80.4	8.2
22	.419	.470	.379	.091	81.8	86.0	79.8	6.2
23	.460	.509	.417	.092	82.2	87.4	79.5	7.9
24	.495	.549	.452	.097	83.3	88.9	80.0	8.9
25	.521	.553	.477	.076	83.4	87.4	80.8	6.6
26	.434	.520	.343	.177	82.7	86.6	79.9	6.7
27	<i>Sunday.</i>							
28	.561	.623	.506	.117	84.0	88.0	80.8	7.2
29	.542	.603	.463	.140	83.9	88.3	81.9	6.4
30	.429	.519	.340	.179	83.1	88.4	80.2	8.2
31	.414	.492	.357	.135	82.2	87.0	79.6	7.4

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Va- pour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Hu- midity, complete sa- turation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.3	2.9	79.8	4.4	0.995	10.66	1.58	0.87
2	80.7	3.3	79.0	5.0	.970	.40	.77	.86
3	80.9	3.8	79.0	5.7	.970	.37	2.05	.84
4	81.0	3.6	79.2	5.4	.976	.45	1.94	.84
5	80.8	4.4	78.6	6.6	.958	.23	2.38	.81
6	<i>Sunday.</i>							
7	81.0	3.9	79.0	5.9	.970	.37	.12	.83
8	80.6	3.4	78.9	5.1	.967	.37	1.80	.85
9	79.4	1.6	78.6	2.4	.958	.34	0.80	.93
10	79.3	2.4	78.1	3.6	.943	.14	1.23	.89
11	80.3	2.7	78.9	4.1	.967	.39	.43	.88
12	81.4	3.1	79.8	4.7	.995	.64	.71	.86
13	<i>Sunday.</i>							
14	80.9	2.8	79.5	4.2	.986	.57	.50	.88
15	81.2	2.8	79.8	4.2	.995	.66	.51	.88
16	81.3	3.0	79.8	4.5	.995	.64	.64	.87
17	80.8	1.8	79.9	2.7	.998	.72	0.96	.92
18	77.1	1.6	76.3	2.4	.890	9.65	.76	.93
19	78.1	2.8	76.7	4.2	.902	.72	1.38	.88
20	<i>Sunday.</i>							
21	80.2	3.0	78.7	4.5	.961	10.31	.58	.87
22	79.4	2.4	78.2	3.6	.946	.17	.23	.89
23	79.8	2.4	78.6	3.6	.958	.30	.24	.89
24	80.6	2.7	79.2	4.1	.976	.48	.45	.88
25	80.5	2.9	79.0	4.4	.970	.42	.54	.87
26	79.9	2.8	78.5	4.2	.955	.27	.45	.88
27	<i>Sunday.</i>							
28	80.0	4.0	78.0	6.0	.940	.07	2.10	.83
29	80.7	3.2	79.1	4.8	.973	.42	1.71	.86
30	79.6	3.5	77.8	5.3	.934	.03	.83	.85
31	79.1	3.1	77.5	4.7	.925	9.94	.60	.86

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.512	29.630	29.389	0.241	81.7	84.2	77.9	6.3
1	.497	.611	.379	.232	81.5	84.0	78.4	5.6
2	.486	.588	.377	.211	81.4	83.8	78.7	5.1
3	.476	.579	.353	.226	81.2	83.6	78.0	5.6
4	.477	.576	.357	.219	81.0	83.4	77.8	5.6
5	.478	.583	.362	.221	80.7	83.2	77.6	5.6
6	.499	.599	.368	.231	80.8	83.7	77.4	6.3
7	.514	.611	.367	.244	81.4	84.2	77.6	6.6
8	.523	.635	.397	.238	82.7	85.6	77.4	8.2
9	.530	.643	.409	.234	83.6	87.3	77.3	10.0
10	.531	.640	.395	.245	84.6	88.2	77.2	11.0
11	.523	.633	.388	.245	85.7	89.5	77.2	12.3
Noon.	.507	.614	.376	.238	86.0	90.4	76.9	13.5
1	.490	.606	.352	.254	86.6	91.7	77.6	14.1
2	.471	.592	.332	.260	85.6	90.4	78.0	12.4
3	.454	.572	.324	.248	85.4	90.0	78.4	11.6
4	.439	.557	.316	.241	85.2	88.2	78.6	9.6
5	.441	.564	.318	.246	84.8	88.4	79.2	9.2
6	.451	.577	.342	.235	84.0	86.6	79.4	7.2
7	.467	.574	.364	.210	83.3	85.7	79.6	6.1
8	.488	.589	.392	.197	82.7	85.0	79.4	5.6
9	.507	.599	.407	.192	82.4	84.5	79.6	4.9
10	.524	.632	.426	.206	82.0	84.0	79.0	5.0
11	.521	.640	.425	.215	81.7	83.8	78.0	5.8

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	{ 79.6	2.1	78.5	3.2	0.955	10.29	1.08	0.91
1	79.6	1.9	78.6	2.9	.958	.32	0.99	.91
2	79.5	1.9	78.5	2.9	.955	.29	.98	.91
3	79.3	1.9	78.3	2.9	.949	.22	.99	.91
4	79.2	1.8	78.3	2.7	.949	.22	.92	.92
5	79.0	1.7	78.1	2.6	.943	.16	.88	.92
6	79.2	1.6	78.4	2.4	.952	.27	.80	.93
7	79.6	1.8	78.7	2.7	.961	.35	.92	.92
8	80.2	2.5	78.9	3.3	.967	.39	1.33	.89
9	80.5	3.8	78.9	4.7	.967	.37	.66	.86
10	81.0	3.6	79.2	5.4	.976	.45	.94	.84
11	81.4	4.3	79.2	6.5	.976	.41	2.39	.81
Noon.	81.4	4.6	79.1	6.9	.973	.38	.53	.80
1	81.5	5.1	78.9	7.7	.967	.30	.84	.78
2	81.2	4.4	79.0	6.6	.970	.35	.41	.81
3	81.3	4.1	79.2	6.2	.976	.43	.25	.82
4	81.2	4.0	79.2	6.0	.976	.43	.18	.83
5	80.9	3.9	78.9	5.9	.967	.34	.12	.83
6	80.5	3.5	78.7	5.3	.961	.31	1.86	.85
7	80.2	3.1	78.6	4.7	.958	.28	.65	.86
8	80.0	2.7	78.6	4.1	.958	.30	.42	.88
9	79.7	2.7	78.3	4.1	.949	.20	.41	.88
10	79.6	2.4	78.4	3.6	.952	.23	.24	.89
11	79.5	2.2	78.4	3.3	.952	.25	.12	.90

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July, 1856.*

Solar radiation, Weather.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	...	0.12	S. E.	[till Noon. Cloudy and also drizzling from 10 A. M.
2	113.0	0.14	S. E.	Cloudless till 4 A. M., scatd. clouds afterwards: also a shower of rain between 1 & 2 P. M.
3	117.5	...	S. E.	Cloudy, also drizzling at 10 A. M.
4	...	0.51	S. E. or S.	Cloudy, also raining between 2 & 3 P. M.
5	126.2	...	S. E. or S.	Cloudy till 7 P. M., cloudless afterwards.
6	Sunday.	0.16		
7	120.0	...	S. E. or S.	Cloudless till 6 A. M., cloudy afterwards.
8	120.0	0.82	S.	Cloudy with much rain, thunder and [lightning from 5 P. M. to midnight.
9	...	0.42	S. E. or S.	Cloudy and occasionally drizzling.
10	...	0.46	S. or S. W.	Cloudy and occasionally drizzling.
11	...	0.36	S. E. or S.	Cloudy with rain at 6 A. M.
12	125.0	0.26	S. E. or S.	Cloudy with rain at 11 P. M.
13	Sunday.	0.46		
14	...	0.20	S. E.	Cloudy, also raining at 2 P. M.
15	120.0	0.61	S. E. or S.	Cloudy and constantly raining. [P. M.
16	...	...	S. W. or S.	Cloudy with little drizzling at 8 & 10
17	...	1.36	S.	Cloudy and constantly raining. [day.
18	...	1.51	S. or S. W.	Cloudy and constantly raining during the
19	...	...	S. W.	Cloudy, also slightly drizzling at 8 & 11 [A. M.
20	Sunday.	0.18		
21	...	...	N. E. or E.	Cloudy, also slightly drizzling at 9 A. M.
22	...	1.52	E.	Cloudy with rain from Noon till 2 P. M.
23	...	0.22	E. or S. E.	Cloudy with rain at 10 A. M. & 2 P. M.
24	126.8	0.66	Variable.	Cloudy with rain at 3 P. M.
25	...	0.10	S. E. or N. E.	Cloudy and rain between 2 & 3 P. M.
26	...	0.14	S. E. or E. or N. E.	Cloudy and raining at 11 A. M., and also [at 1, 10 & 11 P. M.
27	Sunday.	0.61		
28	124.0	...	S.	Cloudy.
29	...	...	S. or S. W.	Cloudy.
30	121.0	...	E. or N. E.	Cloudy and slightly drizzling after 6 P. M.
31	116.4	0.12	S. E.	Cloudy and drizzling occasionally after [sunset]

Ni Cirri, —i Cirro Strati, oi Cumuli, ~i Cumulo Strati, ~i Nimbi. —i Strati, ~i Cirro Cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
for the month of July, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer, for the month,	..	..	29.492
Max. height of the Barometer, occurred at 9 A. M. on the 4th,	..	..	29.643
Min. height of the Barometer, occurred at 4 P. M. on the 21st,	..	..	29.316
Extreme range of the Barometer, during the month,	..	..	0.327

			°
Mean Dry Bulb Thermometer, for the month,	..	..	83.2
Max. Temperature, occurred at 1 P. M. on the 8th,	..	..	91.7
Min. Temperature, occurred at Noon on the 18th,	..	..	76.9
Extreme range of the Temperature, during the month,	..	..	14.8

			°
Mean Wet Bulb Thermometer, for the month,	..	..	80.2
Mean Dry Bulb Thermometer, above Mean Wet Bulb Thermometer,	..	..	3.0
Computed Mean Dew-point for the month,	..	..	78.7
Mean Dry Bulb Thermometer above computed Mean Dew-point,	..	..	4.5

			Inches.
Mean elastic force of vapour for the month,	..	..	0.961
			Troy grains.
Mean weight of vapour for the month,	..	..	10.31
Additional weight of vapour required for complete saturation,	..	..	1.53
Mean degree of Humidity for the month, complete saturation being unity.	..	..	0.87

			Inches.
Rained 29 days. Max. fall of rain during 24 hours,	..	..	1.52
Total amount of rain during the month,	..	..	10.94

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

Latitude 22° 33' 1" North, Longitude 88° 20' 34" East.

Height of the cistern of the Standard Barometer above the level of the Sea, 18.11. ^{feet.}

Daily Means, &c. of the Observations, and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.485	29.532	29.441	0.091	82.1	85.8	79.4	6.4
2	.482	.542	.430	.112	82.6	87.0	79.0	8.0
3	<i>Sunday.</i>							
4	.570	.651	.511	.140	81.2	85.8	78.8	7.0
5	.656	.715	.596	.119	80.2	82.2	79.2	3.0
6	.700	.744	.650	.094	83.6	88.6	79.4	9.2
7	.658	.724	.576	.148	84.7	90.0	81.4	8.6
8	.597	.637	.545	.092	84.8	88.6	81.9	6.7
9	.633	.682	.574	.108	80.9	84.0	78.9	5.1
10	<i>Sunday.</i>							
11	.622	.676	.549	.127	80.8	85.7	77.2	8.5
12	.630	.682	.570	.112	82.7	88.2	78.9	9.3
13	.633	.715	.611	.104	82.7	85.8	80.0	5.8
14	.688	.734	.621	.113	82.2	85.3	78.5	6.8
15	.671	.715	.594	.121	84.2	88.8	80.6	8.2
16	.613	.679	.535	.144	83.6	87.2	81.2	6.0
17	<i>Sunday.</i>							
18	.607	.661	.560	.101	82.5	88.4	80.6	7.8
19	.666	.731	.613	.118	81.7	83.9	80.4	3.5
20	.714	.760	.669	.091	82.4	85.8	79.6	6.2
21	.719	.786	.659	.127	81.7	85.4	80.2	5.2
22	.720	.773	.655	.118	81.4	86.8	79.7	7.1
23	.683	.730	.616	.114	81.6	84.4	79.8	4.6
24	<i>Sunday.</i>							
25	.648	.713	.585	.128	80.8	83.8	78.8	5.0
26	.669	.717	.610	.107	80.5	84.6	78.9	5.7
27	.706	.770	.619	.151	83.2	88.4	78.8	9.6
28	.667	.726	.584	.142	83.6	89.2	81.0	8.2
29	.634	.695	.560	.135	83.7	89.0	81.0	8.0
30	.596	.657	.503	.154	83.4	88.0	80.5	7.5
31	<i>Sunday.</i>							

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity complete saturation be- ing unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.5	2.6	78.2	3.9	.946	10.17	1.34	.88
2	79.9	2.7	78.5	4.1	.955	.27	.41	.88
3	<i>Sunday.</i>							
4	78.5	2.7	77.1	4.1	.913	9.84	.37	.88
5	78.4	1.8	77.5	2.7	.925	.98	0.90	.92
6	79.9	3.7	78.0	5.6	.940	10.07	1.96	.84
7	80.6	4.1	78.5	6.2	.955	.23	2.19	.82
8	81.2	3.6	79.4	5.4	.983	.51	1.95	.84
9	78.9	2.0	77.9	3.0	.937	.10	.00	.91
10	<i>Sunday.</i>							
11	78.2	2.6	76.9	3.9	.908	9.73	.29	.88
12	79.8	2.9	78.3	4.4	.949	10.20	.52	.87
13	80.5	2.2	79.4	3.3	.983	.56	.16	.90
14	80.1	2.1	79.0	3.2	.970	.44	.10	.91
15	80.2	4.0	78.2	6.0	.946	.13	2.11	.83
16	80.6	3.0	79.1	4.5	.973	.42	1.61	.87
17	<i>Sunday.</i>							
18	80.2	2.3	79.0	3.5	.970	.42	.22	.90
19	79.7	2.0	78.7	3.0	.961	.35	.02	.91
20	79.7	2.7	78.3	4.1	.949	.20	.41	.83
21	78.8	2.9	77.3	4.4	.919	9.90	.47	.87
22	79.4	2.0	78.4	3.0	.952	10.25	.02	.91
23	79.7	1.9	78.7	2.9	.961	.35	0.99	.91
24	<i>Sunday.</i>							
25	78.7	2.1	77.6	3.2	.923	.01	1.06	.90
26	78.8	1.7	77.9	2.6	.937	.10	0.83	.92
27	80.2	3.0	78.7	4.5	.961	.31	1.53	.87
28	80.7	2.9	79.2	4.4	.976	.48	.55	.87
29	80.8	2.9	79.3	4.4	.979	.51	.56	.87
30	80.1	3.3	78.4	5.0	.952	.21	.75	.85
31	<i>Sunday.</i>							

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Hour.	Mean Height of the Barometer at 32° Faht.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.663	29.747	29.488	0.259	80.9	83.2	79.0	4.2
1	.647	.743	.469	.274	80.6	82.6	77.8	4.8
2	.636	.731	.457	.274	80.4	82.4	77.4	5.0
3	.625	.723	.449	.274	80.3	82.0	77.8	4.2
4	.629	.713	.448	.265	80.2	82.2	77.8	4.4
5	.631	.723	.451	.272	80.1	82.3	77.4	4.9
6	.647	.737	.462	.275	80.1	82.4	77.2	5.2
7	.663	.753	.474	.279	80.6	82.8	77.8	5.0
8	.676	.766	.495	.271	81.7	83.8	78.2	5.6
9	.688	.770	.502	.268	82.8	85.7	79.8	5.9
10	.691	.786	.508	.278	83.7	87.1	79.6	7.5
11	.681	.773	.498	.275	84.3	88.6	79.8	8.8
Noon.	.664	.749	.488	.261	84.9	89.6	80.5	9.1
1	.645	.729	.466	.263	85.2	90.0	79.3	10.7
2	.621	.706	.458	.248	85.5	90.0	80.8	9.2
3	.599	.688	.450	.238	85.2	89.0	79.4	9.6
4	.586	.672	.430	.242	84.6	89.0	80.5	8.5
5	.584	.669	.433	.236	84.0	87.6	80.4	7.2
6	.593	.679	.436	.243	83.1	86.4	80.3	6.1
7	.608	.683	.458	.225	82.5	85.2	79.6	5.6
8	.633	.706	.475	.231	82.1	84.0	79.8	4.2
9	.658	.729	.511	.218	81.9	83.6	80.0	3.6
10	.675	.752	.529	.223	81.6	83.6	79.8	3.8
11	.673	.750	.529	.221	81.3	83.4	78.8	4.6

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of Air.	Additional weight of va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.1	1.8	78.2	2.7	0.946	10.19	0.91	0.92
1	78.9	1.7	78.0	2.6	.940	.13	.88	.92
2	78.8	1.6	78.0	2.4	.940	.15	.79	.93
3	78.8	1.5	78.0	2.3	.940	.15	.76	.93
4	78.7	1.5	77.9	2.3	.937	.12	.76	.93
5	78.7	1.4	78.0	2.1	.940	.15	.69	.94
6	78.7	1.4	78.0	2.1	.940	.15	.69	.94
7	79.2	1.4	78.5	2.1	.955	.31	.70	.94
8	79.7	2.0	78.7	3.0	.961	.35	1.02	.91
9	80.1	2.7	78.7	4.1	.961	.33	.42	.88
10	80.4	3.3	78.7	5.0	.961	.31	.76	.85
11	80.6	3.7	78.7	5.6	.961	.29	.99	.84
Noon.	80.7	4.2	78.6	6.3	.958	.26	2.23	.82
1	80.6	4.6	78.3	6.9	.949	.14	.47	.80
2	80.9	4.6	78.6	6.9	.958	.23	.49	.80
3	80.6	4.6	78.3	6.9	.949	.14	.47	.80
4	80.7	3.9	78.7	5.9	.961	.29	.10	.83
5	80.3	3.7	78.4	5.6	.952	.19	1.98	.84
6	79.9	3.2	78.3	4.8	.949	.18	.68	.86
7	79.7	2.8	78.3	4.2	.949	.20	.44	.88
8	79.6	2.5	78.3	3.8	.949	.20	.31	.89
9	79.7	2.2	78.6	3.3	.958	.32	.12	.90
10	79.6	2.0	78.6	3.0	.958	.32	.02	.91
11	79.5	1.8	78.6	2.7	.958	.32	0.92	.92

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	..	0.20	S. E. or S.	Cloudy and constantly drizzling.
2	..	0.50	S. E.	Cloudy and raining between midnight [and 2 A. M.]
3	<i>Sunday.</i>	0.34		
4	117.0	..	E.	Cloudy and drizzling occasionally.
5	..	0.48	E.	Cloudy and occasionally raining.
6	121.5	0.07	S. or S. E.	Cloudy & also rain between 9 & 10 A. M.
7	122.4	..	S. or S. W.	Cloudless till 4 A. M., clouds of various [kinds afterwards.]
8	114.0	..	S. or S. W.	Scattered clouds, also slightly drizzling [between 3 & 4 A. M.]
9	..	1.21	S. W.	Cloudy, and constantly raining.
10	<i>Sunday.</i>	..		[tween midnight and 6 A. M.]
11	..	1.50	S. W. or S. or S. E.	Cloudy, and also constantly raining be-
12	..	0.07	S. W. or S.	Cloudy & slightly drizzling at midnight.
13	..	0.52	S. or S. E.	Cloudy and occasionally raining.
14	..	1.49	S.	Cloudy, and raining very heavily be- [tween midnight and 2 A. M.]
15	129.0	..	S.	Scattered clouds of various kinds.
16	..	0.36	S. E. or S.	Cloudy and occasionally raining.
17	<i>Sunday.</i>	0.04		[and 3 P. M.]
18	..	0.10	N. E. or N. or W.	Cloudy, also a shower of rain between 2
19	..	0.72	S. E. or E.	Cloudy and occasionally raining.
20	..	..	E. or S. E.	Scattered —i.
21	..	..	S. E. or E.	Cloudy & occasionally slightly drizzling.
22	..	0.53	S. E.	Cloudy and constantly raining.
23	..	0.40	S. E. or S.	Cloudy and occasionally raining.
24	<i>Sunday.</i>	0.97		
25	..	0.11	S. E.	Cloudy and occasionally drizzling.
26	..	0.25	S. E.	Cloudy and occasionally drizzling.
27	131.0	..	S.	Scattered —i. [wards.
28	122.0	..	S.	Cloudless till 5 A. M. scattered —i after-
29	135.0	0.32	S.	Scattered clouds and a shower of rain [at 4 P. M.]
30	..	0.12	E.	Cloudy till 6 A. M. scattered clouds of [various kinds afterwards.]
31	<i>Sunday.</i>	..		

—i Cirri, —i cirro strati, —i cumuli, —i cumulo strati, —i Nimbi, —i strati,
—i cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer for the month,	..	....	29.642
Max. height of the Barometer, occurred at 10 A. M. on the 21st,	....		29.786
Min. height of the Barometer, occurred at 4 P. M. on the 2nd,	....		29.430
Extreme range of the Barometer during the month,	..	....	0.356

			°
Mean Dry Bulb Thermometer for the month,	..	....	82.4
Max. Temperature, occurred at 1 & 2 P. M. on the 7th,	..	....	90.0
Min. Temperature, occurred at 6 A. M. on the 11th,	..	....	77.2
Extreme range of the Temperature during the month,	..	....	12.8

			°
Mean Wet Bulb Thermometer for the month,	..	....	79.7
Mean Dry Bulb Thermometer, above Mean Wet Bulb Thermometer,	....		2.7
Computed Mean Dew Point for the month,	..	....	78.3
Mean Dry Bulb Thermometer, above computed Mean Dew Point,	..		4.1

			Inches.
Mean elastic force of vapour for the month,	..	....	0.949

			Troy grains.
Mean weight of vapour for the month,	..	....	10.20
Additional weight of vapour, required for complete saturation.	....		1.41
Mean degree of Humidity for the month, complete saturation being unity,			0.88

			Inches.
Rained 25 days. Max. fall of Rain during 24 hours,	..	....	1.50
Total amount of rain during the month,	..	....	10.30

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August, 1856.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind
blew, together with the number of days on which at the same hour,
when any particular wind was blowing it rained.

Date.	N.	Rain on. N. E.	Rain on. E.	Rain on. S. E.	Rain on. S.	Rain on. S. W.	Rain on. W.	Rain on. N. W.	Rain on. Calm.	Rain on.
	No. of days.									
Midnight.		1	6	3	8	2	9	2		1
1		1	8	1	7	2	9	1		
2		1	6		9	3	8	1		1
3		1	5		9	3	8			1
4	1		6		9	3	7	1		1
5	1		6	1	9		6			2
6	1		8	1	7		6			3
7	1	1	7		8	2	5			3
8	1	4	5		6	2	5			4
9		5	3		3	1	10	1		5
10	1	2	5	2	5	1	8	2		5
11		3	3	1	5	3	10	2		5
Noon.		3	4	1	6	3	7	1		6
1		2	4	2	7	1	9	1		4
2		1	4	2	8	3	9			4
3		1	4	1	7	2	10			1
4			4	3	11	2	8			3
5			4		10	1	9			2
6			3	1	11	1	8			2
7			4		10	2	9			1
8			4		10		10			2
9			5	1	9	2	10			1
10			5		9		10			2
11			5	2	9		10			2

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September, 1856.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the level of the Sea, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.476	29.530	29.400	0.130	85.5	91.6	81.1	10.5
2	.360	.474	.265	.209	83.3	88.0	80.7	7.3
3	.290	.529	.156	.373	80.8	83.2	79.0	4.2
4	.638	.723	.551	.172	84.0	88.6	80.8	7.8
5	.707	.783	.630	.153	85.1	90.2	81.3	8.9
6	.648	.702	.590	.112	85.8	90.6	82.8	7.8
7	<i>Sunday.</i>							
8	.706	.754	.665	.089	85.1	90.8	82.1	8.7
9	.686	.756	.600	.150	85.1	90.2	81.8	8.4
10	.655	.712	.591	.121	82.6	89.6	78.4	11.2
11	.628	.683	.565	.118	82.7	88.8	79.6	9.2
12	.668	.728	.606	.122	83.7	90.8	80.6	10.2
13	.750	.820	.685	.135	82.7	86.0	80.6	5.4
14	<i>Sunday.</i>							
15	.784	.859	.715	.144	81.5	84.6	79.6	5.0
16	.676	.742	.571	.171	84.1	89.0	80.2	8.8
17	.602	.674	.521	.153	85.5	90.3	82.1	8.2
18	.620	.759	.519	.240	80.7	84.4	79.0	5.4
19	.763	.821	.698	.123	79.5	82.9	76.6	6.3
20	.755	.832	.699	.133	81.1	86.2	77.0	9.2
21	<i>Sunday.</i>							
22	.803	.865	.732	.133	84.2	89.8	80.3	9.5
23	.787	.870	.683	.187	84.5	89.8	80.6	9.2
24	.729	.801	.645	.156	84.8	90.3	80.7	9.6
25	.704	.772	.625	.147	84.7	90.0	81.4	8.6
26	.732	.801	.659	.142	84.2	88.5	81.2	7.3
27	.767	.827	.696	.131	83.4	88.6	80.8	7.8
28	<i>Sunday.</i>							
29	.762	.834	.688	.146	82.8	88.8	80.4	8.4
30	.807	.877	.748	.129	81.1	84.2	79.6	4.6

*Abstract of the Results of the Hourly Meteorological Observations
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in the month of September, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.9	4.6	78.6	6.9	0.958	10.23	2.49	0.80
2	80.4	2.9	78.9	4.4	.967	.39	1.54	.87
3	79.0	1.8	78.1	2.7	.943	.16	0.91	.92
4	81.1	2.9	79.6	4.4	.989	.60	1.57	.87
5	81.3	3.8	79.4	5.7	.983	.49	2.08	.84
6	82.1	3.7	80.2	5.6	1.008	.75	.08	.84
7	<i>Sunday.</i>							
8	81.7	3.4	80.0	5.1	.001	.70	1.87	.85
9	81.7	3.4	80.0	5.1	.001	.70	.87	.85
10	79.8	2.8	78.4	4.2	0.952	.23	.45	.88
11	80.0	2.7	78.6	4.1	.958	.30	.42	.88
12	80.5	3.2	78.9	4.8	.967	.37	.70	.86
13	79.6	3.1	78.0	4.7	.940	.09	.63	.86
14	<i>Sunday.</i>							
15	79.4	2.1	78.3	3.2	.949	.22	.09	.90
16	80.4	3.7	78.5	5.6	.955	.23	.98	.84
17	81.6	3.9	79.6	5.9	.989	.56	2.16	.83
18	78.6	2.1	77.5	3.2	.925	9.98	1.06	.90
19	77.4	2.1	76.3	3.2	.890	.63	.03	.90
20	78.7	2.4	77.5	3.6	.925	.96	.21	.89
21	<i>Sunday.</i>							
22	80.6	3.6	78.8	5.4	.964	10.34	.90	.85
23	80.5	4.0	78.5	6.0	.955	.23	2.12	.83
24	80.8	4.0	78.8	6.0	.964	.31	.15	.83
25	80.7	4.0	78.7	6.0	.961	.29	.13	.83
26	80.7	3.5	78.9	5.3	.967	.37	1.87	.85
27	80.2	3.2	78.6	4.8	.958	.28	.68	.86
28	<i>Sunday.</i>							
29	79.9	2.9	78.4	4.4	9.52	.23	.52	.87
30	79.2	1.9	78.2	2.9	.946	.19	0.98	.91

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahrt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.688	29.818	29.262	0.556	81.9	84.4	78.6	5.8
1	.672	.808	.224	.584	81.4	83.9	78.0	5.9
2	.657	.798	.209	.589	81.4	83.4	78.9	4.5
3	.652	.792	.178	.614	81.1	83.6	77.4	6.2
4	.650	.800	.156	.644	80.9	83.4	77.4	6.0
5	.658	.805	.165	.640	80.8	83.6	77.4	6.2
6	.673	.823	.176	.647	80.7	83.6	77.0	6.6
7	.693	.840	.191	.649	81.4	84.0	78.4	5.6
8	.713	.858	.200	.658	82.5	85.7	76.6	9.1
9	.724	.870	.207	.663	83.7	87.2	78.0	9.2
10	.727	.877	.216	.661	84.9	88.2	78.4	9.8
11	.717	.858	.243	.615	86.1	89.6	78.6	11.0
								.
Noon.	.698	.848	.262	.586	86.9	90.6	78.0	12.6
1	.670	.813	.284	.529	87.0	90.8	80.0	10.8
2	.641	.780	.280	.500	87.0	91.6	82.0	9.6
3	.624	.761	.284	.477	86.1	90.3	80.6	9.7
4	.613	.762	.279	.483	85.8	90.3	79.8	10.5
5	.616	.748	.280	.468	85.0	89.4	80.2	9.2
6	.629	.766	.265	.501	84.0	87.8	78.4	9.4
7	.650	.794	.287	.507	83.4	86.4	79.4	7.0
8	.676	.825	.311	.514	82.9	85.8	80.0	5.8
9	.698	.843	.323	.520	82.6	85.4	79.8	5.6
10	.707	.854	.319	.535	82.3	85.2	79.3	5.9
11	.702	.854	.307	.547	81.9	84.7	78.6	6.1

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew point.	Dry Bulb above Dew point.	Mean elastic force of Vapour.	Mean Weight of Va- pour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of hu- midity, complete satu- ration being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid- night.	79.9	2.0	78.9	3.0	0.967	10.41	1.03	0.91
1	79.6	1.8	78.7	2.7	.961	.25	0.92	.92
2	79.5	1.9	78.5	2.9	.955	.29	.98	.91
3	79.3	1.8	78.4	2.7	.952	.25	.92	.92
4	79.3	1.6	78.5	2.4	.955	.31	.79	.93
5	79.3	1.5	78.5	2.3	.955	.31	.76	.93
6	79.3	1.4	78.6	2.1	.958	.34	.70	.94
7	79.8	1.6	79.0	2.4	.970	.46	.81	.93
8	80.0	2.5	78.7	3.8	.961	.33	1.31	.89
9	80.5	3.2	78.9	4.8	.967	.37	.70	.86
10	80.8	4.1	78.7	6.2	.961	.29	2.20	.82
11	81.2	4.9	78.7	7.4	.961	.26	.69	.79
Noon.	81.4	5.5	78.6	8.3	.958	.21	3.04	.77
1	81.4	5.6	78.6	8.4	.958	.21	.08	.77
2	81.3	5.7	78.4	8.6	.952	.12	.17	.76
3	81.1	5.0	78.6	7.5	.958	.21	2.74	.79
4	81.0	4.8	78.6	7.2	.958	.23	.60	.80
5	80.6	4.4	78.4	6.6	.952	.17	.36	.81
6	80.4	3.6	78.6	5.4	.958	.28	1.89	.85
7	80.4	3.0	78.9	4.5	.967	.37	.59	.87
8	80.1	2.8	78.7	4.2	.961	.33	.46	.88
9	80.1	2.5	78.8	3.8	.964	.36	.32	.89
10	80.0	2.3	78.8	3.5	.964	.36	.22	.90
11	79.9	2.0	78.9	3.0	.967	.41	.03	.91

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September, 1856.*

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	137.4	..	N. E. & E.	[P. M., cloudless afterwards.
2	..	0.45	N. E.	Cloudless till 5 A. M. scattered ☉ till 6 Cloudy and constantly drizzling, also a high N. Easter was blowing during the night.
3	..	0.80	S. & N. E. (both blow- [ing high)	Cloudy and constantly raining.
4	..	0.30	E. & S.	Cloudy and occasionally raining. [wards.
5	141.0	..	S.	Cloudless till 6 A. M., scattered ☉ after-
6	128.0	..	W.	Scattered clouds.
7	<i>Sunday.</i>	2.30	..	
8	122.6	..	Variable.	Scattered clouds.
9	123.0	..	S. & S. W.	Cloudless till 6 A. M., cloudy afterwards.
10	126.0	0.66	Variable.	Cloudy and also rain between 4 & 5 P. M.
11	127.0	0.12	E. & N.	Scattered clouds.
12	131.0	0.46	N. E. & S.	Cloudless till 7 A. M., scattd. clouds after- wards, also a shower of rain at 3 P. M.
13	..	..	S. E. & N. E. & E.	Scattered clouds.
14	<i>Sunday.</i>	0.38	..	[wards, also a shower of rain at 10 A. M.
15	..	0.22	E. & S.	Scattered ☾ till 8 A. M., cloudy after-
16	132.0	..	S. E. & S.	Cloudy till 8 A. M., scattd. ☾ afterwards.
17	131.4	..	N. W. & W.	Cloudless till 4 A. M., scattd. clouds af- terwards.
18	..	1.32	W. & E.	Cloudy and constantly drizzling.
19	..	0.56	E. (high) & S.	Cloudy and occasionally raining.
20	117.0	..	E. & S.	Scattered ☉.
21	<i>Sunday.</i>	0.28	..	[P. M., cloudless afterwards.
22	137.0	..	S.	Scattd. ☾ till 7 A. M., scattd. ☉ till 6
23	135.0	..	S.	Cloudless till 6 A. M., scattd. ☉ afterwards.
24	142.5	..	S.	Cloudless till 6 A. M., scattd. ☉ afterwards.
25	136.0	..	S.	Scattd. clouds of various kinds till 6 P. M.
26	..	..	S. E. & S.	Cloudy. [cloudless afterwards.
27	136.4	0.19	S. E. & S.	Cloudless till 6 A. M., scattd. ☾ after- [wards also little rain at 7 A. M. & 2 P. M.
28	<i>Sunday.</i>	..	..	[zling occasionally.
29	128.0	0.10	E. & S.	Scattd. clouds also thundering and driz-
30	..	0.88	E. & S.	Scattd. clouds till 6 P. M., cloudless af- terwards, also raining at 5 A. M. & 4 P. M.

☾ Cirri, ☾i Cirro-strati, ☉ Cumuli, ☾i Cumulo-strati, ☾i Nimbi, —i Strati,
☾i Cirro-cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
for the month of September, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer for the month,	..	..	29.673
Max. height of the Barometer, occurred at 10 A. M. on the 30th,	..	..	29.877
Min. height of the Barometer, occurred at 4 A. M. on the 3d,	..	..	29.156
Extreme range of the Barometer, during the month,	..	..	0.721

			°
Mean Dry Bulb Thermometer for the month,	..	..	83.4
Max. Temperature, occurred at 2 P. M. on the 1st,	..	..	91.6
Min. Temperature, occurred at 8 A. M. on the 19th,	..	..	76.6
Extreme range of the Temperature, during the month,	..	..	15.0

			°
Mean Wet Bulb Thermometer for the month,	..	..	80.3
Mean Dry Bulb Thermometer, above Mean Wet Bulb Thermometer,	..	..	3.1
Computed Mean Dew-point for the month,	..	..	78.7
Mean Dry Bulb Thermometer above computed Mean Dew-point,	..	..	4.7

			Inches.
Mean elastic force of vapour for the month,	..	..	0.961

			Troy grains.
Mean weight of vapour for the month,	..	..	10.31
Additional weight of vapour required for complete saturation,	..	..	1.65
Mean degree of Humidity for the month, complete saturation being unity,	..	..	0.86

			Inches.
Rained 19 days. Max. fall of rain during 24 hours,	..	..	2.30
Total amount of rain during the month,	..	..	9.02
Prevailing direction of the Wind. South and East,	..	..

On Wednesday the 3d, the Barometer at 4 A. M. descended to 29.156 inches, which is the lowest reading we have had for the last three years. After 4 A. M. the Barometer commenced ascending and continuously ascended till midnight: without exhibiting the usual daily tides; the highest reading of the Barometer on the midnight aforesaid of the 4th, being 29.555 inches. During the time the Barometer was indicating the unusual readings described above, it rained incessantly. Also a high North-easter blew from midnight till 9 A. M., after which a light easterly breeze sprung up which continued for three hours. Finally from 1 P. M. till midnight following there was a high southerly breeze. All this took place on the 3d; on the 4th, again the Barometer exhibited the usual daily tides, the weather remaining as unsteady as on the 3d.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September, 1856.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind
blew, together with the number of days on which at the same hour when
any particular wind was blowing it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on
	No. of days.																	
Midnight.	1	2			6		3		10				2	1			2	
1	1	2			6		2		9				2	1			4	
2	1	2	1		5		4		9		1		1	1			2	
3	1	2	1		6		4		10				1	1			2	
4	1	2	1		6		4		9		1		1	1			2	
5	1	1	1		6	1	2		9		3		1	1			1	1
6	3	4			4	1	3	1	6		3		3	1				
7	1	5	1		4		4	1	8	3	3				1			
8	2	5	1		6	1	4		6	1	3							
9		6			4	1	4		6		3							
10	1	4			6		5		5	1	3		1	1		1		
11	1	5			4	1	2		5	2	6		2		1			
Noon.			5		6	2	1		4		5		4		1			
1			5	1	5	1	2		5	1	4		3		2			
2	1		1	1	6	1	4	1	5		4		4		1			
3			1	1	3	2	7		8	2	4		1		2			
4			4	2	4	1	4	1	8	1	4		1		1			
5			3	1	6		3		11	1	2				1			
6			3		5		5		10	1	1		1		1			
7	2	2	2		5		2		13	2	1						1	
8	1		3	1	4	1	2		13				1				2	
9			3		6		2		13				2					
10	1		2		6		2		12	1	1		2					
11	1		2	1	5	1	3		11		1		2	2			1	

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of July, 1856.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.032	99.8	99.4	81.5	N. E.	..	scattered in zenith.
2	29.037	98.8	98.9	81.0	N. W.	..	very few scattered.
3	29.083	88.9	88.0	80.5	N. E.	..	scattered.
4	29.113	84.8	83.8	79.5	N. E.	..	all over.
5	29.087	87.3	86.9	82.3	N. E.	..	scattered.
6	29.063	86.8	87.0	82.0	S. E.	..	ditto.
7	29.125	88.9	88.9	81.9	S. W.	..	ditto.
8	29.105	89.5	89.5	80.5	N. W.	..	ditto.
9	29.079	86.9	87.9	83.3	W.	1.12	ditto.
10	29.055	85.6	86.6	82.1	S. W.	1.12	all over.
11	29.019	90.5	90.9	80.4	N. W.	..	Clear.
12	29.055	89.9	88.6	82.5	E.	..	scattered all over.
13	29.081	87.0	87.0	83.2	E.	0.27	ditto.
14	29.063	86.5	86.5	82.9	S. E.	..	all over.
15	29.023	87.9	88.0	84.2	S. W.	..	ditto.
16	28.995	79.5	79.8	79.0	N. W.	..	ditto.
17	29.003	79.9	80.0	75.5	N. W.	1.37	ditto.
18	29.993	79.2	79.5	78.2	W.	..	ditto.
19	29.027	81.8	81.4	80.0	N. W.	..	ditto.
20	29.055	86.4	86.8	83.0	N.	..	scattered.
21	29.075	90.8	90.8	84.6	N. E.	..	ditto.
22	29.059	92.8	92.4	83.9	N. E.	..	ditto.
23	29.077	90.3	90.0	82.1	N.	..	ditto.
24	29.017	88.3	89.0	81.9	E.	0.15	ditto.
25	29.051	87.0	87.4	82.5	S. E.	..	ditto.
26	29.055	87.0	87.0	83.5	N. E.	1.00	ditto.
27	29.025	85.2	85.2	82.0	S. E.	..	all over.
28	29.005	85.9	85.8	80.5	E.	..	scattered.
29	29.067	84.2	84.5	80.5	E.	..	all over.
30	29.050	86.9	86.9	82.9	N. E.	..	ditto.
31	29.019	87.0	87.4	82.1	N. W.	..	scattered.
Mean.	29.051	87.4	87.5	81.7		5.03	

Note.—The dry bulb and maximum Register do not agree; the former always reads more than the latter. The average difference is 1.6.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of July, 1856.

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.017	192.9	102.6	83.5	N. E.	..	Clear.
2	29.031	101.0	101.2	82.5	N. W.	..	~ scattered all over.
3	29.073	90.8	90.0	82.0	N. E.	..	~ scattered.
4	29.113	85.6	85.0	81.5	E.	..	~ all over.
5	29.057	90.0	89.5	84.0	N.	..	~ scattered.
6	29.051	90.3	90.5	83.5	S. E.	..	Ditto.
7	29.115	91.0	92.0	83.0	N. W.	..	Ditto.
8	29.083	92.0	93.0	82.0	N. W.	..	~ Ditto.
9	29.069	90.5	91.1	83.5	W.	..	~ Ditto.
10	29.047	89.0	89.2	82.0	W.	..	~ all over.
11	29.013	93.5	93.4	80.2	N. W.	..	~ scattered.
12	29.055	90.8	90.1	83.5	E.	..	~ scattered over.
13	29.063	88.0	87.5	82.9	N. E.	..	~ all over.
14	29.033	88.9	89.5	84.5	S. E.	..	~ scattered all over.
15	29.001	88.3	88.0	83.9	N. E.	..	~ all over.
16	28.983	81.9	82.2	80.9	N. W.	..	Ditto.
17	29.003	82.0	81.9	79.5	N. W.	..	Ditto.
18	28.987	81.0	81.1	80.0	W.	..	Ditto.
19	29.041	80.9	80.6	79.5	N. W.	..	Ditto.
20	29.027	87.8	88.2	83.5	N.	..	~ scattered.
21	29.059	90.9	91.5	84.9	N.	..	Ditto.
22	29.071	94.2	94.5	84.2	S. E.	..	Ditto.
23	29.071	92.4	92.1	82.5	N. E.	..	Ditto.
24	29.013	96.6	90.0	81.9	E.	..	Ditto.
25	29.051	87.9	87.5	83.0	S. E.	..	Ditto.
26	29.045	85.8	84.5	82.1	N. E.	..	~ all over.
27	29.003	87.0	87.5	82.0	E.	..	~ scattered.
28	28.955	86.9	86.9	81.0	E.	..	~ all over.
29	29.061	86.5	87.0	81.0	E.	..	Ditto.
30	29.035	85.0	84.0	81.5	N. E.	..	Ditto.
31	28.995	85.5	83.0	80.9	W.	..	Ditto.
Mean.	29.039	89.0	88.8	82.2			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of July, 1856.

Minimum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	28.927	107.8	108.0	85.0	107.0	100.0	98.5	~ scattered in zen.	N. E.	..
2	28.931	83.9	84.5	80.0	104.0	88.0	96.0	~ all over.	N.	1.22
3	28.993	91.9	90.5	82.4	92.0	79.0	85.5	~ scattered.	E.	..
4	29.057	86.0	86.0	82.5	86.0	81.0	83.5	~ all over.	N. E.	0.12
5	29.005	85.9	85.4	81.2	90.0	81.0	85.5	~ scattd. all over.	N. E.	..
6	28.987	95.5	95.0	84.4	96.0	80.0	88.0	~ scattered.	E.	..
7	29.031	88.9	87.2	79.5	96.2	81.0	88.6	~ all over.	N. W.	..
8	29.005	90.5	89.9	81.6	95.0	82.0	88.5	~ scattd. all over.	W.	..
9	28.975	95.2	94.9	83.5	95.2	75.0	85.1	~ all over.	W.	..
10	28.969	94.0	93.8	81.7	93.2	74.5	83.85	~ scattered in zen.	N. W.	..
11	28.933	97.8	97.4	82.5	97.2	82.3	89.75	Clear.	N. W.	..
12	29.005	93.0	91.5	83.0	93.5	85.0	89.25	~ scattd. all over.	E.	..
13	29.011	85.5	84.8	81.5	88.0	82.0	85.0	~ ditto.	N.	..
14	28.955	89.0	88.9	83.5	89.5	80.8	85.15	~ ditto.	E.	..
15	28.939	88.0	87.0	82.2	88.5	81.8	85.15	~ all over.	N. E.	..
16	28.915	85.0	84.9	81.5	84.5	75.2	79.85	~ ditto.	N. W.	..
17	28.959	83.0	82.9	80.5	83.0	77.8	80.4	~ ditto.	N. W.	..
18	28.941	81.0	81.0	80.0	81.2	76.8	79.0	~ ditto.	W.	0.17
19	28.963	82.9	82.5	80.0	82.5	78.0	80.25	~ ditto.	N.	.42
20	28.977	92.5	91.9	85.9	92.0	77.9	84.95	~ scattered.	N.	..
21	29.029	95.2	95.0	85.0	95.2	84.0	89.6	~ ditto.	N. E.	..
22	28.977	97.9	96.8	84.5	97.1	85.0	91.05	~ ditto.	S. E.	..
23	28.965	93.0	90.0	81.5	93.5	84.0	88.75	~ ditto.	E.	..
24	28.937	89.0	89.8	84.0	90.0	82.5	86.25	~ ditto.	E.	..
25	29.001	91.5	91.5	83.4	91.2	80.8	86.0	~ ditto.	S. E.	..
26	28.965	83.0	82.5	81.0	87.2	80.5	83.85	~ all over.	N.	0.77
27	28.941	85.0	86.0	83.0	88.5	79.8	84.15	~ scattered.	S.	0.52
28	28.903	86.9	86.9	81.0	87.0	80.2	83.6	~ all over.	E.	0.62
29	29.001	89.9	89.5	81.9	89.5	79.2	84.35	~ ditto.	S. E.	..
30	28.977	88.9	88.0	82.3	89.3	81.2	85.25	~ ditto.	N. W.	0.32
31	28.967	83.9	84.0	82.0	88.0	82.0	85.0	~ ditto.	S. W.	0.92
Mean.	28.972	89.7	89.3	81.3	91.3	80.9	86.11			5.08

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of August, 1856.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.063	84.0	85.0	81.0	N. E.	..	☼ all over.
2	29.021	84.2	84.5	82.1	N. E.	1.57	☼ ditto.
3	29.073	84.5	84.0	81.0	W.	..	☼ ditto.
4	29.157	81.0	81.0	79.9	E.	..	☼ ditto.
5	29.181	84.0	85.5	81.5	E.	..	☼ ditto.
6	29.201	83.9	83.5	79.9	E.	0.17	☼ ditto.
7	29.201	83.0	83.6	80.0	S. W.	..	☼ scattered.
8	29.137	84.9	85.0	80.0	W.	0.20	☼ ditto all over.
9	29.179	83.0	83.5	78.5	N. W.	..	☼ all over.
10	29.155	83.5	84.0	79.0	N. W.	..	☼ ditto.
11	29.177	84.0	84.3	79.2	N. W.	..	☼ ditto.
12	29.219	84.5	84.9	81.0	N.	..	☼ ditto.
13	29.227	84.8	84.1	80.4	N. W.	..	☼ ditto.
14	29.205	87.0	88.0	83.4	W.	..	☼ ditto.
15	29.159	86.2	86.0	80.9	S. W.	..	☼ ditto.
16	29.109	78.0	78.0	77.0	W.	..	☼ ditto.
17	29.135	80.0	80.9	78.5	S.	0.92	☼ ditto.
18	29.157	82.0	83.0	80.0	S. E.	1.92	☼ ditto.
19	29.205	85.0	85.4	81.4	N. E.	0.32	☼ ditto.
20	29.267	85.0	84.9	80.5	N. E.	..	☼ scattered.
21	29.243	84.0	84.0	80.2	E.	..	☼ all over.
22	29.245	85.0	85.5	81.0	E.	..	☼ ditto.
23	29.203	85.5	86.0	81.1	E.	..	☼ scattered.
24	29.187	83.0	82.8	80.0	S. E.	..	☼ all over.
25	29.199	84.9	85.5	81.0	W.	..	☼ ditto.
26	29.203	79.8	79.9	78.9	W.	1.42	☼ ditto.
27	29.225	80.9	82.4	79.5	N. E.	1.40	☼ ditto.
28	29.255	83.3	83.9	79.9	S. W.	..	☼ ditto.
29	29.219	85.1	85.9	82.0	S. W.	..	☼ ditto.
30	29.183	85.9	86.4	82.1	N. E.	..	☼ scattered all over.
31	29.115	82.9	84.0	81.0	N. E.	..	☼ scattered.
Mean.	29.177	83.6	84.0	80.3		7.92	

Barometer Observations corrected for Capillarity only.

Symbols. { ☼ Cirrus.
☼ Cirro strata.
☼ Cumuli.
☼ Cumulo strata.
☼ Nimbi or Nimbus.

Note.—The dry bulb and maximum Register do not agree; the former always reads more than the latter. The average difference is 1.6.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of August, 1856.

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.047	86.1	87.0	82.5	E.	..	☼ scattered all over.
2	29.001	84.9	88.2	82.1	E.	..	„ all over.
3	29.063	85.0	84.5	81.0	W.	..	„ ditto.
4	29.141	83.9	83.5	86.5	E.	..	„ ditto.
5	29.165	82.8	83.4	81.9	W.	..	„ ditto.
6	29.177	85.2	86.0	80.0	E.	..	„ ditto.
7	29.183	86.0	86.9	81.8	S. W.	..	„ scattered.
8	29.105	86.9	87.0	81.0	W.	..	„ ditto all over.
9	29.142	84.9	84.6	78.4	W.	..	„ all over.
10	29.129	85.8	86.2	79.7	N. W.	..	„ ditto.
11	29.133	86.2	86.9	80.0	N. W.	..	„ ditto.
12	29.203	86.9	86.5	81.8	N.	..	„ ditto.
13	29.203	86.0	86.5	82.2	N. W.	..	„ ditto.
14	29.199	89.0	87.3	82.5	W.	..	„ ditto.
15	29.131	87.9	88.0	80.5	S. W.	..	„ ditto.
16	29.097	78.9	78.4	77.5	W.	..	„ ditto.
17	29.109	83.5	83.5	79.0	S. W.	..	„ ditto.
18	29.135	84.8	84.5	80.4	S. E.	..	„ ditto.
19	29.189	85.9	86.5	81.4	N. E.	..	„ ditto.
20	29.243	86.9	87.9	81.4	E.	..	„ scattered.
21	29.225	85.2	85.2	81.0	S. E.	..	„ all over.
22	29.213	87.5	88.4	82.4	S. E.	..	„ ditto.
23	29.173	85.5	83.1	80.4	S. E.	..	„ ditto.
24	29.155	85.5	85.0	81.0	S. E.	..	„ ditto.
25	29.177	83.5	79.9	78.0	W.	..	„ ditto.
26	29.189	81.9	82.2	79.6	N. W.	..	„ ditto.
27	29.205	82.9	81.6	80.5	N. E.	..	„ ditto.
28	29.217	85.0	85.5	80.9	S. W.	..	„ scattered all over.
29	29.201	86.9	87.1	81.5	S. W.	..	„ all over.
30	29.155	87.9	88.5	82.9	N. E.	..	„ scattered all over.
31	29.097	84.0	85.0	81.9	N. E.	..	„ scattered.
Mean.	29.155	85.2	85.0	80.8			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of August, 1856.

Minimum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	28.973	85.0	81.0	81.0	89.0	79.0	84.0	{ all over.	N. W.	..
2	28.957	83.9	84.0	82.0	86.5	83.8	85.15	{ ditto.	S.	0.67
3	29.021	86.0	86.0	81.4	85.5	78.5	82.0	{ scattered.	W.	..
4	29.073	87.8	87.5	82.2	87.5	78.0	82.75	{ all over.	S.	0.17
5	29.085	86.9	86.7	83.2	88.2	78.0	83.1	,, ditto.	S. W.	0.77
6	29.103	88.9	87.9	81.0	89.0	78.5	83.75	,, scattered.	E.	..
7	29.085	82.0	83.0	80.9	89.5	78.5	84.0	,, all over.	N. W.	..
8	29.039	88.9	88.5	81.6	89.0	79.0	84.0	,, scat.all over	N. W.	..
9	29.079	85.5	85.0	77.5	86.0	78.8	82.4	,, all over.	W.	..
10	29.069	84.0	83.6	77.5	88.5	79.0	83.75	,, ditto.	N. W.	0.50
11	29.051	87.9	88.1	80.5	88.0	79.0	83.5	,, ditto.	N.	..
12	29.127	84.9	84.4	79.5	87.1	78.5	82.8	,, ditto.	N. E	0.44
13	29.137	89.9	89.4	83.1	89.5	78.5	84.0	,, ditto.	N. E.	..
14	29.109	86.9	86.0	81.3	90.0	81.2	85.6	,, ditto.	N. W.	..
15	29.051	85.0	84.0	80.5	90.0	79.5	84.75	,, ditto.	W.	..
16	29.027	78.9	78.5	77.0	80.5	75.0	77.75	,, ditto.	W.	5.12
17	29.065	79.5	79.5	78.5	84.5	74.5	79.5	,, ditto.	N.	..
18	29.071	81.0	81.3	80.	84.8	76.9	80.85	,, ditto.	N. E.	0.22
19	29.123	85.0	85.0	82.5	88.5	76.9	82.7	,, ditto.	E.	0.20
20	29.153	88.9	88.9	80.9	88.9	79.0	83.95	,, in horizon.	N. E.	..
21	29.133	84.0	84.5	81.5	89.0	79.8	84.4	,, all over.	E.	..
22	29.129	89.9	89.2	81.6	90.0	77.5	83.75	,, ditto.	S. E.	..
23	29.095	89.0	88.0	82.2	89.0	79.0	84.0	,, ditto.	N. E.	..
24	29.109	81.0	81.0	78.6	85.5	79.0	82.25	,, ditto.	S. W.	0.62
25	29.105	79.8	79.6	78.5	85.2	77.0	81.1	,, ditto.	W.	1.02
26	29.123	82.9	82.0	80.0	84.0	75.0	79.5	,, ditto.	N. W.	..
27	29.139	79.9	79.6	78.9	82.0	77.2	79.6	,, ditto.	N.	0.62
28	29.145	87.8	87.2	82.0	88.8	76.0	82.4	,, ditto.	S. W.	..
29	29.125	85.5	83.0	79.5	90.0	76.0	83.0	,, ditto. [over.	S.	..
30	29.051	84.9	83.9	81.0	88.5	78.9	83.7	,, scattered all	E.	..
31	29.043	86.3	86.0	82.0	87.0	79.5	83.25	,, scattered.	E.	..
Mean.	29.083	85.1	85.0	80.5	87.4	78.2	82.81			10.35

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October, 1856.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.840	29.894	29.779	0.115	80.9	86.2	78.4	7.8
2	.811	.885	.741	.144	81.5	87.0	77.6	9.4
3	.762	.833	.703	.130	81.2	84.1	79.0	5.1
4	.735	.807	.655	.152	83.6	88.6	79.3	9.3
5	<i>Sunday.</i>							
6	.714	.793	.655	.138	85.1	90.4	81.6	8.8
7	.738	.788	.699	.089	82.8	89.0	79.0	10.0
8	.779	.840	.724	.116	81.4	87.6	79.0	8.6
9	.771	.850	.684	.166	83.7	89.2	79.3	9.9
10	.698	.784	.638	.146	78.8	82.4	76.2	6.2
11	.624	.673	.577	.096	81.3	85.0	77.0	8.0
12	<i>Sunday.</i>							
13	.758	.815	.713	.102	81.9	85.8	78.6	7.2
14	.799	.853	.753	.100	82.7	88.0	79.3	8.7
15	.846	.906	.788	.118	82.6	87.8	79.3	8.5
16	.844	.918	.777	.141	84.1	89.4	79.4	10.0
17	.831	.893	.778	.115	83.1	86.9	80.0	6.9
18	.830	.907	.766	.141	81.4	87.1	77.0	10.1
19	<i>Sunday</i>							
20	.719	.785	.660	.125	80.0	86.6	74.4	12.2
21	.738	.801	.696	.105	79.4	84.8	74.1	10.7
22	.738	.799	.684	.115	79.6	84.8	74.4	10.4
23	.771	.834	.723	.111	77.7	83.4	72.0	11.4
24	.823	.884	.772	.112	76.9	80.4	74.2	6.2
25	.887	.951	.838	.113	77.4	82.8	73.0	9.8
26	<i>Sunday.</i>							
27	.918	.982	.852	.130	80.0	86.0	74.8	11.2
28	.893	.972	.831	.141	80.5	87.0	74.3	12.7
29	.829	.898	.760	.138	81.3	87.5	76.4	11.1
30	.817	.868	.763	.105	80.4	88.6	76.6	12.0
31	.894	.966	.812	.154	76.7	79.6	74.9	4.7

The Mean height of the Barometer, as likewise the Mean dry and wet Bulb Thermometers are derived, from the twenty-four hourly observations made, during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon. (Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Va- pour required for com- plete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	78.7	2.2	77.6	3.3	0.928	10.01	1.09	0.90
2	79.0	2.5	77.7	3.8	.931	.02	.29	.89
3	79.3	1.9	78.3	2.9	.949	.22	0.99	.91
4	80.4	3.2	78.8	4.8	.964	.34	1.69	.86
5	<i>Sunday.</i>							
6	81.8	3.3	80.1	5.0	1.005	.73	.84	.85
7	80.2	2.6	78.9	3.9	0.967	.39	.36	.88
8	78.8	2.6	77.5	3.9	.925	9.96	.31	.88
9	79.8	3.9	77.8	5.9	.934	10.01	2.06	.83
10	77.1	1.7	76.2	2.6	.887	9.60	0.84	.92
11	79.4	1.9	78.4	2.9	.952	10.25	.99	.91
12	<i>Sunday.</i>							
13	79.4	2.5	78.1	3.8	.943	.14	1.30	.89
14	79.2	3.5	77.4	5.3	.922	9.91	.81	.85
15	79.2	3.4	77.5	5.1	.925	.94	.74	.85
16	80.1	4.0	78.1	6.0	.943	10.10	2.11	.83
17	79.2	3.9	77.2	5.9	.916	9.83	.03	.83
18	75.2	6.2	72.1	9.3	.778	8.38	.89	.74
19	<i>Sunday.</i>							
20	74.4	5.6	71.6	8.4	.766	.27	.54	.77
21	74.0	5.4	71.3	8.1	.753	.20	.42	.77
22	73.9	5.7	71.0	8.6	.751	.10	.59	.76
23	71.1	6.6	67.8	9.9	.677	7.33	.77	.73
24	72.8	4.1	70.7	6.2	.744	8.08	1.78	.82
25	74.3	3.1	72.7	4.7	.792	.59	.42	.86
26	<i>Sunday.</i>							
27	74.7	5.3	72.0	8.0	.776	.36	2.45	.77
28	74.5	6.0	71.5	9.0	.763	.23	.75	.75
29	76.2	5.1	73.6	7.7	.817	.79	.45	.78
30	76.3	4.1	74.2	6.2	.832	.98	1.96	.82
31	74.4	2.3	73.2	3.5	.806	.75	.05	.89

If the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.797	29.923	29.631	0.292	79.3	84.0	74.9	9.1
1	.783	.922	.614	.308	79.0	83.8	74.9	8.9
2	.776	.906	.592	.314	78.6	83.4	75.0	8.4
3	.764	.900	.577	.323	78.5	83.2	74.5	8.7
4	.768	.900	.581	.319	78.1	82.8	73.5	9.3
5	.776	.921	.589	.332	78.0	82.6	73.0	9.6
6	.800	.934	.610	.324	77.7	82.4	72.6	9.8
7	.821	.959	.632	.327	78.3	83.6	72.0	11.6
8	.843	.969	.667	.302	80.0	86.0	73.2	12.8
9	.855	.980	.671	.309	80.9	87.2	73.0	14.2
10	.853	.982	.673	.309	82.1	88.6	73.6	15.0
11	.836	.949	.658	.291	83.2	89.0	76.4	12.6
Noon.	.809	.924	.627	.297	84.8	88.6	75.4	13.2
1	.782	.904	.609	.295	85.1	89.1	77.4	11.7
2	.761	.878	.590	.288	84.7	89.4	78.4	11.0
3	.745	.873	.590	.283	84.8	90.4	76.2	14.2
4	.743	.891	.585	.306	84.0	90.4	75.4	15.0
5	.750	.914	.603	.311	83.2	89.6	74.9	14.7
6	.758	.914	.614	.300	81.8	86.2	75.5	10.7
7	.778	.929	.633	.296	81.0	85.7	75.8	9.9
8	.798	.955	.648	.307	80.5	85.3	75.8	9.5
9	.808	.965	.658	.307	80.2	85.0	75.6	9.4
10	.812	.966	.660	.306	79.9	85.0	75.2	9.8
11	.808	.962	.660	.302	79.5	84.4	75.4	9.0

The Mean height of the Barometer, as likewise the Mean dry and wet Bulb Thermometers are derived from the Observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew point.	Dry Bulb above Dew point.	Mean elastic force of Vapour.	Mean Weight of Va- pour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of hu- midity, complete satu- ration being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid- night.	76.9	2.4	75.7	3.6	0.873	9.43	1.16	0.89
1	76.8	2.2	75.7	3.3	.873	.45	.05	.90
2	76.4	2.2	75.3	3.3	.862	.34	.04	.90
3	76.4	2.1	75.3	3.2	.862	.34	.01	.90
4	76.0	2.1	74.9	3.2	.851	.22	.00	.90
5	75.9	2.1	74.8	3.2	.849	.20	0.99	.90
6	75.6	2.1	74.5	3.2	.840	.12	.98	.90
7	76.1	2.2	75.0	3.3	.854	.25	1.03	.90
8	76.8	3.2	75.2	4.8	.860	.28	.53	.86
9	76.9	4.0	74.9	6.0	.851	.17	.93	.83
10	77.4	4.7	75.0	7.1	.854	.18	2.33	.80
11	77.6	5.6	74.8	8.4	.849	.11	.78	.77
Noon.	78.3	6.5	75.0	9.8	.854	.12	3.34	.73
1	78.6	6.5	75.3	9.8	.862	.21	.36	.73
2	78.3	6.4	75.1	9.6	.857	.15	.27	.74
3	78.1	6.7	74.7	10.1	.846	.05	.41	.73
4	77.8	6.2	74.7	9.3	.846	.06	.11	.74
5	77.8	5.4	75.1	8.1	.857	.19	2.70	.77
6	77.6	4.2	75.5	6.3	.868	.35	.05	.82
7	77.7	3.3	76.0	5.0	.882	.50	1.64	.85
8	77.6	2.9	76.1	4.4	.885	.55	.43	.87
9	77.4	2.8	76.0	4.2	.882	.52	.36	.88
10	77.2	2.7	75.8	4.1	.876	.46	.32	.88
11	76.9	2.6	75.6	3.9	.871	.40	.26	.88

All the Hygrometrical elements are computed by the Greenwich constants.

Meteorological Observations.

v

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	General Aspect of the Sky.
1	o	Inches.		[o'clock,
2	..	0.39	S. E. & E.	Cloudy, also occasionally raining after 12
3	..	2.13	S. & S. E.	Cloudy, also raining in the morning & at 5 P. M.
4	..	0.56	S. E. & S.	Cloudless till 4 A. M., cloudy till 9 P. M., cloudless afterwards. Also raining at 9 A. M.
5	..	..	S.	Cloudless till 6 A. M. scattered ci till 6 P. M. cloudless afterwards.
6	Sunday.	0.16	W. & S. E.	Cloudless till 4 A. M. scatd. ci till 6 P. M., cloudless afterwards. Also slight rain at 10 A. M. & 6 P. M.
7	..	2.00	S.	Cloudless till 4 A. M. cloudy afterwards, also heavy rain from 2 P. M. to 3 P. M.
8	140.0	0.16	N. E.	Cloudless till 4 A. M. scatd. \i & ci till Noon, cloudy afterwards, also slight rain between 2 & 4 P. M.
9	141.0	..	E. & N. & N. E.	Scattered clouds of various kinds.
10	..	1.84	N. E.	Cloudy with incessant rain from 7 A. M. till midnight.
11	..	0.52	E. & S. E. (both blowing high.)	Cloudy, also constantly drizzling between midnight & 10 A. M.
12	Sunday.	0.63		
13	..	0.49	S. & E. & S. E.	Cloudy, also raining heavily at midnight.
14	141.0	..	S. & S. W.	Scatd. clouds of various kinds. [wards,
15	136.0	..	Variable.	Cloudless till 6 A. M. scatd. clouds after-
16	148.0	..	Variable.	Cloudless till 7 A. M. scatd. clouds till 5 P. M. cloudless afterwards.
17	133.0	..	N. W. & N. & S. W.	Scatd. \i & ci till 9 A. M. cloudy till 4
18	143.0	..	N. W.	Cloudless. [P. M. cloudless afterwards,
19	Sunday.			
20	143.5	..	N. W.	Cloudless till 5 A. M. scatd. \i & \i till 3 P. M. cloudless afterwards. [wards,
21	131.2	..	N. W.	Scatd. \i & \i till 7 P. M., cloudless after-
22	132.0	..	N. W.	Cloudless till 4 A. M. scatd. \i till 6 P. M. cloudless afterwards. [wards,
23	128.0	..	N. W. & W.	Cloudless till 4 A. M. scatd. clouds after-
24	..	..	N. W.	Cloudy.
25	132.8	0.10	S.	Scatd. clouds and occasionally drizzling before sunrise.
26	Sunday.			
27	140.2	..	N. W.	Cloudless till 10 A. M. scatd. \i & \i & ci till 4 P. M. cloudless afterwards.
28	143.6	..	N. W.	Cloudless till 8 A. M. scatd. \i & ci till 8 P. M. cloudless afterwards.
29	134.0	..	N. & S.	Cloudless till 3 A. M. scatd. \i & ci till 6 P. M. cloudless afterwards.
30	143.0	0.10	N. & S. E.	Scatd. clouds of various kinds till 3 P. M. cloudy with little rain till 7 P. M. cloudless afterwards.
31	..	0.13	N. E. & S.	Cloudless till 3 A. M. cloudy afterwards with little rain between 2 and 5 P. M.

\i Cirri. \i cirro strati. ci cumuli. ci cumulo strati. \i nimbi. \i strati

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer for the month,	...	...	29.793
Max. height of the Barometer, occurred at 10 A. M. on the 27th,	...	...	29.982
Min. height of the Barometer, occurred at 3 A. M. on the 11th,	...	...	29.577
Extreme Range of the Barometer during the month,	...	...	0.405

			0
Mean Dry Bulb Thermometer for the month,	...	...	81.0
Max. Temperature, occurred at 3 & 4 P. M. on the 6th,	...	...	90.4
Min. Temperature, occurred at 7 A. M. on the 23rd,	...	...	72.0
Extreme Range of the Temperature during the month,	...	...	18.4

Mean Wet Bulb Thermometer for the month,	...	...	77.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer,	...	...	3.8
Computed Mean Dew Point for the month,	...	...	75.3
Mean Dry Bulb Thermometer above computed Mean Dew Point,	...	...	5.7
			Inches.
Mean Elastic force of vapour for the month,	...	...	0.862

			Troy grains.
Mean weight of vapour for the month,	...	...	9.29
Additional weight of vapour required for complete saturation,	...	...	1.85
Mean degree of Humidity for the month, complete saturation being unity,	...	...	0.83

			Inches.
Rained 15 days. Max. fall of rain during 24 hours,	...	...	2.13
Total amount of rain during the month,	...	...	9.21
Prevailing direction of the Wind N. W. & S.			

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October, 1856.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind
blew, together with the number of days on which at the same hour,
when any particular wind was blowing it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.		
						No. of days.														
Midnight.	1	3	1	2		3		3	1	1		1		7	1	6				
1	2	3	1	2		2		4		1		1		6		6				
2	2	1	1	3	1	3		4		1		1		6		5				
3	1	1	2	3	1	3		4		1		1		7		5				
4	3		2	3		3		4		1				8		2				
5	2		2	3		1	4	1	4		1	1		7	1	2				
6	2		2	2		1	6	2	3		1	2		7		2				
7	3		2	2		5	1	4		3		3		5						
8	5		2	1	3	1	2	4	1	2		2		7	1					
9	6		2	1	4	2	1	3		2		2		6	1					
10	6		2	1	4	1	1	1	3		1	4	1	6	1					
11	7	1	1		3		2	1	2		3	1	3		6					
Noon.	5		2	1		4		3		2		4		7						
1	5		2	1	1	4	1	1		2		3		9						
2	4		3	2		4	2	5	1			5		6						
3	4	1	3	2	2	1	2	2		3		5		6						
4	1		3	2	2	2	1	4		2		4		9						
5	1		4	1		2	2	6	2	1		4	1	9						
6			2	1	1	6	2	8				2		8						
7			2	1	1	4		9				1		7		3				
8			3	1	1	3	1	8				1		7		4				
9	1		3	1	1	2		8				2		7		3				
10	1		3	1	1	2		8				2		7		3				
11			4	1	1	3	1	7				2		7		3				

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
for the month of November, 1856.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.966	30.042	29.924	0.118	80.1	87.4	74.5	12.9
2	<i>Sunday.</i>							
3	.961	.029	.904	.135	80.6	87.3	74.2	13.1
4	.916	.001	.854	.147	81.0	87.3	75.6	11.7
5	.906	29.982	.841	.141	80.9	86.9	76.6	10.3
6	.934	30.008	.886	.122	80.9	87.2	76.7	10.5
7	.955	.028	.900	.128	80.5	86.8	75.4	11.4
8	.932	29.998	.879	.119	79.6	86.6	74.4	12.2
9	<i>Sunday.</i>							
10	.990	30.055	.946	.109	76.7	84.4	69.2	15.2
11	.985	.065	.927	.138	75.0	82.6	69.7	12.9
12	30.006	.079	.958	.121	74.9	83.4	67.4	16.0
13	.022	.105	.958	.147	74.3	82.9	67.4	15.5
14	.007	.087	.949	.138	73.2	82.0	66.2	15.8
15	29.980	.055	.932	.123	74.1	84.8	67.2	15.6
16	<i>Sunday.</i>							
17	30.001	.076	.932	.144	75.0	82.9	68.3	14.6
18	29.965	.041	.914	.127	75.1	82.6	69.0	13.6
19	.949	.011	.901	.110	74.4	81.8	68.6	13.2
20	.973	.054	.932	.122	73.9	80.2	69.0	11.2
21	.986	.055	.948	.107	73.6	82.2	67.6	14.6
22	.978	.039	.935	.104	71.8	76.6	68.4	8.2
23	<i>Sunday.</i>							
24	.964	.037	.911	.126	71.0	74.2	67.2	7.0
25	.977	.030	.925	.105	73.2	77.8	70.8	7.0
26	.988	.071	.928	.143	71.8	79.4	66.4	13.0
27	.973	.050	.898	.152	70.0	77.4	63.9	13.5
28	.950	.028	.896	.132	68.8	77.6	61.9	15.7
29	.971	.047	.921	.126	69.5	78.4	62.3	16.1
30	<i>Sunday.</i>							

The Mean height of the Barometer, as likewise the Mean dry and wet Bulb Thermometers are derived, from the Twenty-four hourly observations made, during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
for the month of November, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	75.1	5.0	72.6	7.5	0.790	8.52	2.32	0.79
2	<i>Sunday.</i>							
3	75.8	4.8	73.4	7.2	.811	.75	.26	.80
4	76.1	4.9	73.6	7.4	.817	.80	.34	.79
5	76.4	4.5	74.1	6.8	.830	.94	.16	.81
6	76.0	4.9	73.5	7.4	.814	.78	.32	.79
7	75.2	5.3	72.5	8.0	.787	.49	.49	.77
8	73.3	6.3	70.1	9.5	.729	7.87	.82	.74
9	<i>Sunday.</i>							
10	69.1	7.6	65.3	11.4	.623	6.78	3.02	.69
11	67.4	7.6	63.6	11.4	.590	.43	2.88	.69
12	68.1	6.8	64.7	10.2	.611	.66	.62	.72
13	67.3	7.0	63.8	10.5	.593	.46	.66	.71
14	66.5	6.7	63.1	10.1	.580	.34	.48	.72
15	67.5	6.6	64.2	9.9	.601	.56	.51	.72
16	<i>Sunday.</i>							
17	69.0	6.0	66.0	9.0	.638	.95	.36	.75
18	68.9	6.2	65.8	9.3	.634	.91	.43	.74
19	69.5	4.9	67.0	7.4	.659	7.20	1.95	.79
20	69.0	4.9	66.5	7.4	.648	.09	.92	.79
21	68.0	5.6	65.2	8.4	.621	6.80	2.13	.76
22	67.4	4.4	65.2	6.6	.621	.81	1.64	.81
23	<i>Sunday.</i>							
24	69.2	1.8	68.3	2.7	.683	7.55	0.70	.92
25	70.6	2.6	69.3	3.9	.711	.77	1.05	.88
26	67.6	4.2	65.5	6.3	.628	6.90	.55	.82
27	63.8	6.2	60.7	9.3	.536	5.89	2.11	.74
28	63.1	5.7	60.2	8.6	.527	.80	1.91	.75
29	64.0	5.5	61.2	8.3	.544	6.00	.88	.76
30	<i>Sunday.</i>							

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Faht.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.968	30.028	29.906	0.122	72.3	78.7	65.2	13.5
1	.962	.020	.897	.123	71.7	78.4	64.4	14.0
2	.953	.012	.893	.119	71.3	77.8	63.7	14.1
3	.948	.002	.886	.116	71.0	77.6	63.4	14.2
4	.947	.004	.888	.116	70.2	77.0	62.7	14.3
5	.960	.013	.907	.106	69.9	77.0	62.2	14.8
6	.981	.048	.927	.121	69.6	76.7	61.9	14.8
7	30.004	.060	.957	.103	70.1	77.2	62.2	15.0
8	.029	.038	.975	.113	72.8	80.1	65.0	15.1
9	.043	.105	.982	.123	75.5	82.0	69.2	12.8
10	.038	.082	.977	.105	77.1	83.0	70.6	12.4
11	.015	.068	.945	.123	79.1	86.1	73.2	12.9
Noon.	29.984	.040	.912	.128	80.8	86.8	73.4	13.4
1	.952	.011	.884	.127	81.6	87.4	73.8	13.6
2	.932	29.994	.854	.140	82.2	87.3	74.2	13.1
3	.921	.975	.841	.134	81.7	87.3	73.4	13.9
4	.919	.970	.845	.125	80.1	85.8	73.2	12.6
5	.925	.976	.853	.123	79.0	85.6	72.9	12.7
6	.934	.985	.861	.124	77.2	83.6	71.2	12.4
7	.951	30.007	.887	.120	75.9	82.0	69.6	12.4
8	.966	.024	.900	.124	75.0	81.2	68.2	13.0
9	.976	.039	.910	.129	74.1	80.4	67.6	12.8
10	.982	.034	.905	.129	73.1	79.8	66.8	13.0
11	.973	.034	.898	.136	72.7	79.4	66.0	13.4

The Mean height of the Barometer, as likewise the Mean dry and wet Bulb Thermometers are derived from the Observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic Force of Vapour.	Mean Weight of Va- pour in a cubic foot of Air.	Additional Weight of Vapour required for complete satu- ration.	Mean degree of Hu- midity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	69.2	3.1	67.6	4.7	0.672	7.37	1.21	0.86
1	68.7	3.0	67.2	4.5	.664	.28	.15	.86
2	68.5	2.8	67.1	4.2	.661	.26	.07	.87
3	68.1	2.9	66.6	4.4	.651	.15	.10	.87
4	67.6	2.6	66.3	3.9	.644	.09	0.96	.88
5	67.4	2.5	66.1	3.8	.640	.04	.94	.88
6	67.3	2.3	66.1	3.5	.640	.04	.86	.89
7	67.6	2.5	66.3	3.8	.644	.09	.94	.88
8	68.7	4.1	66.6	6.2	.651	.12	1.59	.82
9	69.8	5.7	66.9	8.6	.657	.15	2.31	.76
10	70.1	7.0	66.6	10.5	.651	.05	.87	.71
11	70.9	8.2	66.8	12.3	.655	.09	3.44	.67
Noon.	71.2	9.6	66.4	14.4	.646	6.97	4.10	.63
1	71.5	10.1	66.4	15.2	.646	.95	.39	.61
2	72.0	10.2	66.9	15.3	.657	7.06	.48	.61
3	71.4	10.3	66.2	15.5	.642	6.89	.48	.61
4	70.8	9.3	66.1	14.0	.640	.90	3.94	.64
5	71.0	8.0	67.0	12.0	.659	7.12	.38	.68
6	71.3	5.9	68.3	8.9	.688	.46	2.49	.75
7	70.9	5.0	68.4	7.5	.690	.50	.07	.78
8	70.7	4.3	68.5	6.5	.692	.54	1.77	.81
9	70.2	3.9	68.2	5.9	.686	.49	.58	.83
10	69.5	3.6	67.7	5.4	.674	.39	.40	.84
11	69.3	3.4	67.6	5.1	.672	.37	.31	.85

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November, 1856.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	144.4	..	S.	Scattered clouds till 6 P. M. cloudless afterwards.
2	<i>Sunday.</i>			
3	141.0	..	W. & S.	Cloudless.
4	145.8	..	S. W. & W.	Cloudless nearly the whole day.
5	136.7	..	S. W. & W.	Cloudless till 5 A. M. scattered \i and \i till 6 P. M. cloudless afterwards.
6	139.0	..	N.	Cloudless till 9 A. M. scattered \i till 5 P. M. cloudless afterwards.
7	141.5	..	N. & N. W.	Cloudless till 9 A. M. scattered \i till 5 P. M. cloudless afterwards.
8	142.0	..	N. & W.	Cloudless till 9 A. M. scattered \i till 5 P. M. cloudless afterwards.
9	<i>Sunday.</i>			
10	141.0	..	N. W. & W. & N.	Cloudless.
11	138.2	..	N. W.	Cloudless.
12	141.0	..	N. W. & W.	Cloudless.
13	140.6	..	N. W.	Cloudless.
14	139.7	..	N. W. & W. & S.	Cloudless.
15	139.0	..	N. W.	Cloudless.
16	<i>Sunday.</i>			
17	140.4	..	N. W.	Clouds of various kinds.
18	136.0	..	N. W.	Cloudless till 11 A. M. scattered \i till 4 P. M. cloudless afterwards.
19	133.0	..	N. W. & S. W.	Cloudless till 8 A. M. scattered \i & \i till 2 P. M. cloudy till 6 P. M. cloudless afterwards.
20	..	..	N.	Cloudless till 6 A. M. cloudy till 7 P. M. cloudless afterwards.
21	139.2	..	N. & N. E.	Cloudless till 6 A. M. scattered clouds of all kinds afterwards. [ally.
22	..	..	N. E.	Cloudy and slightly drizzling occasion-
23	<i>Sunday.</i>			
24	..	..	N. E. & N.	Cloudy.
25	..	..	N. W. & N.	Cloudy till 8 P. M. cloudless afterwards.
26	128.0	..	N. W.	Cloudless till 3 A. M. cloudy till 6 A. M. cloudless till 10 A. M. scattered \i till 5 P. M. cloudless afterwards.
27	130.5	..	N. W. & W.	Cloudless.
28	135.0	..	W. & N. W.	Cloudless.
29	132.0	..	N. & W.	Cloudless.
30	<i>Sunday.</i>			

\i Cirri, \i Cirro strati, \i Cumuli, \i Cumulo strati, \i Nimbi, —i Strati, \i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer for the month,	..	..	29.969
Max. height of the Barometer occurred at 9 A. M. on the 13th,	..	..	30.105
Min. height of the Barometer occurred at 3 P. M. on the 5th,	..	..	29.841
Extreme range of the Barometer during the month,	..	..	0.264

			°
Mean Dry Bulb Thermometer for the month,	..	..	75.2
Max. Temperature occurred at 1 P. M. on the 1st,	..	..	87.4
Min. Temperature occurred at 6 A. M. on the 28th,	..	..	61.9
Extreme range of the Temperature during the month,	..	..	25.5

			°
Mean Wet Bulb Thermometer for the month,	..	..	69.7
Mean Dry Bulb Thermometer above mean Wet Bulb Thermometer,	..	..	5.5
Computed Mean Dew-point for the month,	..	..	66.9
Mean Dry Bulb Thermometer above computed mean Dew-point,	..	..	8.3
			Inches.
Mean Elastic force of Vapour for the month,	..	..	0.657

			Troy grains.
Mean Weight of Vapour for the month,	..	..	7.16
Additional Weight of Vapour required for complete saturation,	..	..	2.21
Mean degree of humidity for the month, complete saturation being unity,	..	..	0.76

			Inches.
Slightly Drizzling 2 days, Max. fall of rain during 24 hours,	..	..	Nil.
Total amount of rain during the month,	..	..	Nil.
Prevailing direction of the Wind,	..	..	.. N. W. & N.

From Saturday the 22nd to Tuesday the 25th, it was cloudy day and night: the sun being scarcely once visible, also it was drizzling occasionally which rain was so small that it was not indicated by the Pluviometer. The readings of the Barometer were very steady during the four cloudy days in question.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November, 1856.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind
blew, together with the number of days on which at the same hour when
any particular wind was blowing it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on
					No. of days.													
Midnight.	7	1	1						1		1		6		7		2	
1	6		2						1		2		5		7		2	
2	7		1						1		2		3		8		1	
3	7		1						1		2		4		8		1	
4	7		2						1		2		5		7		1	
5	7		2						1		2		6		6		1	
6	8		2						1		2		6		7			
7	7		2						1		1		5		9			
8	8		3						1				4		9			
9	8		3						1				3		10			
10	8		4		1						1		3		8			
11	6		4	1	1				1		1		4		8			
Noon.	6		4				1				1		4		8			
1	6		3		1				1		1		6		7			
2	6		3	1					1		3		3		9			
3	3		2	1							2		7		11			
4	4		4								3		6		8			
5	4		3		1				1		1		6		9			
6	4		2		1				2		3		3		10			
7	3		1		1				4		3		3		9		1	
8	3		1		1				3		3		3		9		2	
9	3		2						2		4		4		8		2	
10	4		2						2		3		3		8		2	
11	3		2						2		3		4		9		2	

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

Latitude 22° 33' 1" North. Longitude 88° 20' 24" East.

feet.

Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.983	30.051	29.931	0.120	71.8	80.2	65.8	14.4
2	.980	.045	.928	.117	71.9	79.9	66.5	13.4
3	.991	.053	.937	.116	71.6	79.0	66.2	12.8
4	30.019	.086	.967	.119	71.4	80.2	65.0	15.2
5	.032	.095	.974	.121	71.9	80.8	65.3	15.5
6	.039	.109	.975	.134	71.3	79.9	64.6	15.3
7	<i>Sunday.</i>							
8	.053	.113	.993	.120	69.9	79.0	62.4	16.6
9	.067	.139	30.016	.123	69.7	77.0	64.0	13.0
10	.071	.141	.016	.125	69.8	75.2	66.1	9.1
11	.050	.125	29.988	.137	69.1	78.9	62.0	16.9
12	.052	.121	.987	.134	69.2	78.3	62.7	15.6
13	.070	.151	30.028	.123	68.0	78.4	60.7	17.7
14	<i>Sunday.</i>							
15	.015	.100	29.948	.152	67.5	77.5	59.8	17.7
16	29.987	.054	.922	.132	67.8	77.6	60.6	17.0
17	.998	.078	.942	.136	67.5	77.5	60.0	17.5
18	.985	.068	.937	.131	65.0	75.3	57.0	18.3
19	30.001	.070	.953	.117	65.2	76.0	56.9	19.1
20	.038	.125	.990	.135	64.6	75.4	56.4	19.0
21	<i>Sunday.</i>							
22	.083	.172	30.035	.137	65.5	75.0	59.4	15.6
23	.075	.146	29.999	.147	64.8	75.6	55.8	19.8
24	.029	.102	.957	.145	66.6	76.2	57.2	19.0
25	<i>Xmas.</i>							
26	.041	.103	.992	.111	69.6	80.6	61.6	19.0
27	.069	.151	30.007	.144	70.1	80.6	62.2	18.4
28	<i>Sunday.</i>							
29	29.966	.059	.916	.143	67.0	77.2	58.8	18.4
30	.984	.061	.927	.134	68.0	77.4	60.0	17.4
31	.973	.045	.906	.139	67.4	76.6	60.1	16.5

The Mean height of the Barometer, as likewise the Mean dry and wet Bulb Thermometers are derived from the twenty-four hourly Observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Va- pour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Hu- midity, complete sa- turation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	67.0	4.8	64.6	7.2	0.609	6.69	1.76	0.79
2	66.9	5.0	64.4	7.5	.605	.63	.85	.78
3	66.7	4.9	64.2	7.4	.601	.60	.80	.79
4	65.9	5.5	63.1	8.3	.580	.37	.93	.76
5	65.8	6.1	62.7	9.2	.572	.27	2.21	.74
6	65.3	6.0	62.3	9.0	.565	.20	.13	.74
7	<i>Sunday.</i>							
8	63.1	6.8	59.7	10.2	.518	5.70	.28	.71
9	64.3	5.4	61.6	8.1	.552	6.07	1.86	.77
10	64.3	5.5	61.5	8.3	.550	.06	.89	.76
11	63.3	5.8	60.4	8.7	.530	5.84	.94	.75
12	62.9	6.3	59.7	9.5	.518	.70	2.11	.73
13	61.5	6.5	57.6	10.4	.483	.33	.20	.71
14	<i>Sunday.</i>							
15	61.9	5.6	58.5	9.0	.498	.50	1.92	.74
16	62.3	5.5	59.0	8.8	.506	.59	.89	.75
17	61.9	5.6	58.5	9.0	.498	.50	.92	.74
18	59.0	6.0	55.4	9.6	.449	4.93	.89	.73
19	58.9	6.3	55.1	10.1	.444	.94	.97	.72
20	58.5	6.1	54.8	9.8	.440	.88	.90	.72
21	<i>Sunday.</i>							
22	58.7	6.8	54.6	10.9	.437	.85	2.13	.70
23	58.3	6.5	54.4	10.4	.434	.82	.01	.71
24	60.6	6.0	57.0	9.6	.473	5.23	1.98	.73
25	<i>Xmas.</i>							
26	63.3	6.3	60.1	9.5	.525	.77	2.13	.73
27	63.4	6.7	60.0	10.1	.523	.75	.28	.72
28	<i>Sunday.</i>							
29	62.2	4.8	59.3	7.7	.511	.65	1.65	.77
30	63.4	4.6	60.6	7.4	.534	.90	.63	.78
31	62.8	4.6	60.0	7.4	.523	.79	.60	.78

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	30.026	30.107	29.953	0.154	65.1	69.4	59.8	9.6
1	.024	.100	.954	.146	64.4	69.0	59.1	9.9
2	.015	.080	.955	.125	63.7	68.7	58.6	10.1
3	.007	.067	.952	.115	63.2	68.4	58.2	10.2
4	.005	.063	.954	.109	62.8	68.1	57.5	10.6
5	.011	.071	.959	.112	62.2	67.5	56.8	10.7
6	.031	.087	.969	.118	61.7	66.9	56.4	10.5
7	.053	.108	30.000	.108	61.5	66.6	55.8	10.8
8	.031	.139	.032	.107	63.6	68.5	56.8	11.7
9	.097	.165	.045	.120	67.1	72.8	61.0	11.8
10	.096	.172	.039	.133	70.0	75.2	64.4	10.8
11	.077	.143	.019	.124	72.6	77.0	68.4	8.6
Noon.	.043	.115	29.978	.137	74.9	79.1	71.8	7.3
1	.008	.073	.954	.119	76.7	80.4	73.6	6.8
2	29.986	.047	.930	.117	77.8	80.7	75.0	5.7
3	.972	.039	.910	.129	77.5	80.8	74.8	6.0
4	.971	.040	.906	.134	75.5	78.2	72.8	5.4
5	.979	.038	.920	.118	74.0	77.6	71.4	6.2
6	.989	.038	.920	.118	71.6	74.8	68.4	6.4
7	30.006	.068	.941	.127	69.9	73.1	66.0	7.1
8	.020	.086	.950	.136	68.6	71.8	64.3	7.5
9	.031	.098	.958	.140	67.5	71.4	62.0	9.4
10	.038	.107	.959	.148	66.6	70.2	61.2	9.0
11	.033	.110	.951	.159	65.8	69.8	60.4	9.4

The Mean height of the Barometer, as likewise the Mean dry and wet bulb Thermometers are derived from the Observations made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Wet Bulb Thermo- meter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Va- pour required for com- plete saturation.	Mean degree of Humidity, complete saturation be- ing unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	61.4	3.7	59.2	5.9	0.509	5.66	1.23	0.82
1	60.9	3.5	58.4	6.0	.496	.51	.23	.82
2	60.3	3.4	57.9	5.8	.488	.42	.17	.82
3	59.9	3.3	57.6	5.6	.483	.37	.12	.83
4	59.7	3.1	57.5	5.3	.481	.38	.03	.84
5	59.2	3.0	57.1	5.1	.475	.31	0.98	.84
6	58.8	2.9	56.8	4.9	.470	.26	.93	.85
7	58.8	2.7	56.9	4.6	.472	.27	.89	.86
8	60.0	3.6	57.5	6.1	.481	.36	1.21	.82
9	61.9	5.2	58.8	8.3	.503	.56	.76	.76
10	63.5	6.5	60.2	9.8	.527	.79	2.21	.72
11	65.0	7.6	61.2	11.4	.544	.97	.69	.69
Noon.	65.8	9.1	61.2	13.7	.544	.93	3.35	.64
1	66.4	10.3	61.2	15.5	.544	.90	.90	.60
2	66.6	11.2	61.0	16.8	.541	.85	4.28	.58
3	66.2	11.3	60.5	17.0	.532	.77	.27	.58
4	65.1	10.4	59.9	15.6	.521	.66	3.80	.60
5	65.2	8.8	60.8	13.2	.537	.86	.18	.65
6	65.4	6.2	62.3	9.3	.565	6.20	2.20	.74
7	64.7	5.2	62.1	7.8	.561	.17	1.81	.77
8	64.0	4.6	61.7	6.9	.554	.10	.57	.80
9	63.3	4.2	60.8	6.7	.537	5.94	.48	.80
10	62.6	4.0	60.2	6.4	.527	.84	.37	.81
11	61.9	3.9	59.6	6.2	.516	.73	.31	.81

All the Hygrometrical elements are computed by the Greenwich constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	General Aspect of the Sky.
	°	Inches.		
1	135.0	..	N. W. & N.	Cloudless till 10 A. M. scattered ☽ till 5 P. M. cloudless afterwards.
2	130.5	..	N. W. & N.	Cloudless till 11 A. M. scattered ☽ till 6 P. M. cloudless afterwards.
3	132.0	..	S. W. & N. W.	Cloudless till 10 A. M. scattered ☽ & ☾ till 6 P. M. cloudless & foggy afterwards.
4	140.0	..	N. W. & N. & S. W.	Cloudless till 11 A. M. scattered ☾ & ☽ till 9 P. M. cloudless afterwards.
5	136.0	..	N. W. & N.	Cloudless till 11 A. M. scattered ☽ & ☾ till 5 P. M. cloudless afterwards.
6	133.4	..	N. W. & N.	Cloudless till 11 A. M. scattered ☽ till 3 P. M. cloudless afterwards.
7	<i>Sunday.</i>			
8	133.4	..	N. W. & N.	Cloudless till 1 P. M. scattered clouds
9	..	..	N.	Cloudy. [afterwards.
10	..	..	N. W. & N.	Cloudy.
11	136.5	..	N. W. & W.	Scattered ☾. [wards.
12	132.0	..	N.	Scattered ☾ till 3 A. M. cloudless after-
13	133.2	..	N.	Cloudless.
14	<i>Sunday.</i>			[7 P. M. cloudless afterwards.
15	134.0	..	N.	Cloudless till 3 P. M. scattered ☾ till
16	130.2	..	N. W.	Cloudless.
17	135.0	..	N. W. & N. & N. E.	Cloudless, also foggy before sunrise.
18	131.6	..	N. & N. W.	Cloudless.
19	132.0	..	N. W. & N.	Cloudless.
20	133.0	..	N. W. & N.	Cloudless.
21	<i>Sunday.</i>			[8 A. M. cloudless afterwards.
22	131.0	..	N. & N. W.	Cloudless till 2 A. M. scattered ☾ till
23	126.5	..	N. W.	Cloudless.
24	129.8	..	N. & N. W.	Cloudless.
25	Xmas.			
26	134.3	..	N. W.	Cloudless.
27	135.6	..	N. W. & N.	Cloudless.
28	<i>Sunday.</i>			
29	135.0	..	Variable.	Cloudless.
30	132.0	..	Calm & N. W.	Cloudless till 11 A. M. scattered ☾ till 4 P. M. cloudless afterwards.
31	131.0	..	Calm & W.	Cloudless till 6 A. M. scattered ☽ & ☾ till 8 P. M. cloudless afterwards.

☽ Cirri, ☾ Cirro strati, ☽ Cumuli, ☾ Cumulo strati, ☾ Nimbi, —i Stra
☾i Cirro cumuli.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

MONTHLY RESULTS.

			Inches.
Mean height of the Barometer for the month,	..	..	30.025
Max. height of the Barometer occurred at 10 A. M. on the 22nd,	..	..	30.172
Min. height of the Barometer occurred at 4 P. M. on the 31st,	..	..	29.906
Extreme range of the Barometer during the month,	..	..	0.266

			°
Mean Dry Bulb Thermometer for the month,	..	..	68.5
Max. Temperature occurred at 3 P. M. on the 5th,	..	..	80.8
Min. Temperature occurred at 7 A. M. on the 23rd,	..	..	55.8
Extreme range of the Temperature during the month,	..	..	25.0

			°
Mean Wet Bulb Thermometer for the month,	..	..	62.8
Mean Dry Bulb Thermometer above mean Wet Bulb Thermometer,			5.7
Computed Mean Dew-point for the month,	..	..	59.9
Mean Dry Bulb Thermometer above computed mean Dew-point,	..	..	8.6
			Inches.
Mean Elastic force of Vapour for the month,	..	..	0.521

			Troy grains.
Mean Weight of Vapour for the month,	..	..	5.74
Additional Weight of Vapour required for complete saturation,	..	..	1.91
Mean degree of humidity for the month, complete saturation being unity,			0.75

			Inches.
Rained No.	Max. fall of rain during 24 hours,	..	Nil.
Total amount of rain during the month,	..	..	Nil.
Prevailing direction of the Wind,	N. W. & N.		

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December, 1856.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour when any particular wind was blowing it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.
							No. of days.											
Mid- night.	} 9										1		2		9		5	
1	8										1		2		10		5	
2	8		1								1		2		9		5	
3	10		1								1		2		9		3	
4	10		1								1		1		9		3	
5	10		1								1		1		10		2	
6	10		2								1		1		10		2	
7	8		3		1								1		12		1	
8	12		2										1		11			
9	10		2												14			
10	11		2												13			
11	10		1		1				1						13			
Noon.	9				1						1		1		14			
1	7												2		17			
2	8								1		1		2		14			
3	8										3		1		14			
4	12										2		2		10			
5	9										2		1		14			
6	10										3		1		12			
7	9										2		1		13			
8	9						1				2		1		13			
9	11						1				1		2		11			
10	11						1				1		1		12			
11	11						1				1		1		11		1	

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of September, 1856.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.135	85.9	86.0	82.6	S. W.	...	☼ scattered.
2	29.093	83.2	83.5	80.5	N. W.	...	☼ ditto
3	29.131	84.5	85.0	80.0	N. W.	0.12	☼ all over.
4	29.205	84.9	85.0	78.9	N. W.	...	☼ scattered.
5	29.179	82.5	83.5	80.5	N. E.	0.62	☼ all over.
6	29.053	78.1	78.5	77.0	N. W.	...	☼ ditto.
7	29.105	77.5	78.1	76.7	N. W.	...	☼ ditto.
8	29.329	83.9	84.4	77.5	N. W.	...	☼ scattered in zenith.
9	29.339	84.9	84.9	76.9	N. W.	...	Clear.
10	29.285	84.8	84.9	75.0	N. W.	...	Ditto.
11	29.323	84.8	85.0	76.0	N. W.	...	☼ scattered in zenith.
12	29.345	85.5	85.5	76.0	N. W.	...	Clear.
13	29.389	86.9	87.4	75.9	N. W.	...	Ditto.
14	29.401	89.5	89.7	81.0	N. W.	...	☼ scattered.
15	29.381	88.9	88.5	81.2	N. E.	...	☼ ditto.
16	29.271	88.9	88.5	81.9	N. E.	...	☼ ditto.
17	29.271	88.9	88.5	80.2	N. E.	...	☼ ditto.
18	29.329	91.0	91.0	82.6	N. W.	...	☼ ditto.
19	29.341	87.0	87.5	79.0	S. E.	...	☼ ditto.
20	29.335	85.7	85.0	76.9	E.	...	☼ scattered.
21	29.343	84.0	84.3	77.5	S. E.	...	☼ all over.
22	29.337	84.2	85.0	78.5	S.	1.72	☼ scattered.
23	29.381	83.5	84.0	79.0	S.	0.40	☼ ditto.
24	29.369	82.9	83.9	76.5	N. W.	...	☼ ditto in zenith.
25	29.329	84.9	85.0	78.0	N. W.	...	☼ scattered.
26	29.373	85.9	85.9	74.5	W.	...	Clear.
27	29.399	85.9	86.0	74.5	S. W.	...	Ditto.
28	29.405	86.0	85.5	74.2	N. W.	...	Ditto.
29	29.413	86.5	87.2	74.5	N. W.	...	Ditto.
30	29.453	86.9	87.4	77.0	N. W.	...	Ditto.
Mean.	29.301	84.9	85.5	78.0			

NOTE.—The dry bulb and maximum Register do not agree; the former always reads more than the latter. The average difference is 1.6.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of September, 1856.

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.091	87.7	88.0	82.5	S. W.	...	☼ scattered.
2	29.067	86.0	86.5	80.5	N. W.	...	☼ ditto.
3	29.105	85.5	86.0	80.5	N. W.	...	☼ all over.
4	29.215	87.9	88.0	80.0	N. W.	...	☼ scattered.
5	29.141	84.0	84.4	79.5	N. E.	...	☼ all over.
6	29.037	78.9	78.4	77.4	W.	...	☼ ditto.
7	29.089	78.5	78.8	77.5	N. W.	0.10	☼ ditto.
8	29.311	86.0	86.5	78.5	N. W.	...	☼ scattered in zenith.
9	29.323	86.9	86.9	77.9	N. W.	...	☼ ditto.
10	29.271	86.0	86.4	76.9	N. W.	...	Clear.
11	29.325	87.0	87.5	76.2	N. W.	...	☼ scattered in zenith.
12	29.327	88.0	88.9	76.6	N. W.	...	Clear.
13	29.371	89.0	89.9	76.0	N. W.	...	Ditto.
14	29.381	91.5	91.5	82.0	N. W.	...	☼ scattered.
15	29.345	90.2	90.9	80.5	N. W.	...	☼ ditto.
16	29.233	90.9	91.9	81.9	N. E.	...	☼ ditto.
17	29.253	90.5	90.2	81.5	N. E.	...	☼ ditto.
18	29.273	91.2	91.8	81.0	N. W.	...	☼ ditto.
19	29.331	88.2	88.5	78.9	S. E.	...	☼ ditto.
20	29.311	85.0	84.0	76.5	E.	...	☼ all over.
21	29.309	86.0	86.5	78.5	S. E.	...	☼ scattered.
22	29.229	86.5	87.5	80.2	S. E.	...	☼ all over.
23	29.347	85.0	85.5	79.9	S.	...	☼ scattered.
24	29.339	85.1	85.1	77.0	N. W.	...	☼ ditto all over.
25	29.209	86.8	87.0	78.0	N. W.	...	☼ scattered.
26	29.355	87.9	88.5	73.9	N. W.	...	Clear.
27	29.377	87.8	88.5	72.9	N. W.	...	Ditto.
28	29.389	88.2	88.6	74.5	N. W.	...	Ditto.
29	29.397	88.9	88.5	73.2	N. W.	...	Ditto.
30	29.431	88.0	89.0	76.9	N. W.	...	Ditto.
Mean.	29.272	86.9	87.3	78.2			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of September, 1856.

Minimum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	29.017	82.0	81.0	79.1	88.0	78.5	83.25	~ all over.	S. E.	0.79
2	28.997	89.4	89.0	82.0	89.5	77.0	83.25	„ scattered.	N. W.	..
3	29.057	89.0	89.5	82.0	89.5	76.9	83.2	„ ditto.	N. W.	..
4	29.189	81.9	81.5	78.9	90.0	76.9	83.45	„ all over.	N. E.	0.12
5	29.063	80.9	80.9	78.6	82.0	77.0	79.5	„ ditto.	E.	0.14
6	29.001	80.9	80.5	78.5	80.5	75.0	77.75	„ ditto.	N. W.	0.4
7	29.039	88.0	88.8	79.0	80.5	75.5	78.0	„ scattered.	N. W.	..
8	29.267	90.5	89.5	80.4	89.5	75.5	82.5	„ ditto.	N. W.	..
9	29.255	90.9	90.0	78.5	90.0	75.8	82.9	Clear.	N. W.	..
10	29.217	88.8	87.2	77.5	89.5	74.9	82.2	~ all over.	N. W.	..
11	29.215	90.0	89.0	77.9	91.0	76.5	85.25	„ scattered in zen.	N. W.	..
12	29.275	92.5	91.5	76.5	92.0	75.5	83.75	Clear.	N. W.	..
13	29.319	94.1	93.2	75.4	93.5	75.5	84.5	Ditto.	N. W.	..
14	29.303	95.0	94.9	83.0	94.9	79.0	86.95	~ scattered.	N. W.	..
15	29.237	93.8	92.5	81.5	94.0	79.8	86.9	„ ditto.	N. E.	..
16	29.143	93.5	93.9	81.6	94.8	79.5	87.15	„ ditto.	N. E.	..
17	29.173	90.0	89.0	81.2	92.0	79.9	85.95	„ all over.	S. E.	..
18	29.235	91.1	90.5	82.4	93.1	82.0	87.55	„ ditto.	N.	..
19	29.275	91.5	89.4	78.9	89.5	77.9	83.7	„ scattered above	S. E.	..
20	29.233	82.9	82.0	77.5	86.0	77.9	81.95	„ all over. [hor.	E.	..
21	29.229	89.0	88.9	80.5	89.2	75.0	82.1	„ scattered.	S. E.	..
22	29.237	88.0	87.5	79.0	88.5	75.6	82.05	~ all over.	S. E.	..
23	29.289	87.2	87.5	79.8	87.8	74.9	81.35	~ scattered.	N. E.	..
24	29.263	89.0	88.4	77.4	88.0	76.8	82.4	~ ditto all over.	N. W.	..
25	29.237	90.9	90.9	78.0	90.0	77.0	83.5	Clear.	N. W.	..
26	29.291	91.2	91.0	76.1	91.2	76.5	83.85	Ditto.	N. W.	..
27	29.337	91.9	91.0	74.6	91.0	75.8	83.4	Ditto.	N. W.	..
28	29.309	91.5	91.0	75.5	91.2	75.0	83.1	Ditto.	N. W.	..
22	29.331	92.5	91.9	71.1	92.0	74.0	83.0	Ditto.	N. W.	..
30	29.359	92.8	91.5	74.0	92.5	77.0	84.75	Ditto.	N. W.	..
Mean.	29.214	89.3	88.7	78.5	89.8	76.8	83.30			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of October, 1856.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.465	85.5	85.5	76.0	N. E.	...	Clear.
2	29.439	84.8	85.1	73.0	N. W.	...	Ditto.
3	29.425	83.9	84.5	74.0	N. W.	...	Ditto.
4	29.383	84.9	86.0	72.0	N. W.	...	Ditto.
5	29.386	85.0	86.0	70.0	N. W.	...	Ditto.
6	29.389	85.0	86.5	68.0	N. W.	...	Ditto.
7	29.401	85.9	86.6	71.4	S. E.	...	Ditto.
8	29.415	88.0	89.4	70.0	N.	...	Ditto.
9	29.405	86.0	86.7	70.0	N. E.	...	Ditto.
10	29.393	84.0	85.0	69.0	N. W.	...	Ditto.
11	29.341	82.8	84.0	66.0	N. W.	...	Ditto.
12	29.285	82.5	83.6	64.5	N. W.	...	Ditto.
13	29.343	83.0	84.9	69.4	S. E.	...	Ditto.
14	29.417	83.2	83.9	65.5	W.	...	Ditto.
15	29.471	81.9	83.0	68.0	N. W.	...	Ditto.
16	29.505	82.0	84.4	66.4	N. W.	...	Ditto.
17	29.485	83.9	84.9	69.5	N. W.	...	Ditto.
18	29.479	83.4	84.4	66.2	N. W.	...	Ditto.
19	29.426	83.7	84.5	66.6	N. W.	...	Ditto.
20	29.373	84.8	85.0	67.0	W.	...	Ditto.
21	29.419	82.0	85.5	65.0	N. W.	...	Ditto.
22	29.441	79.1	80.2	63.0	W.	...	Ditto.
23	29.449	77.1	79.2	60.0	W.	...	Ditto.
24	29.469	78.0	78.8	60.0	W.	...	Ditto.
25	29.511	76.8	78.5	60.5	N. W.	...	Ditto.
26	29.523	77.6	79.0	62.7	N. W.	...	Ditto.
27	29.535	77.5	79.4	65.0	N. W.	...	Ditto.
28	29.559	80.0	81.2	64.9	W.	...	Ditto.
29	29.523	78.5	80.4	64.5	N. W.	...	Ditto.
30	29.475	77.1	79.4	65.0	N. W.	...	Ditto.
31	29.531	77.9	80.5	66.4	N. W.	...	Ditto.
Mean.	29.440	82.1	83.4	67.0			

NOTE.—The dry bulb and Maximum Register do not agree ; the former always reads more than the latter. The average difference is 1.6.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of October, 1856.

Observations at Apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.445	87.1	88.0	74.9	N. E.	...	Clear.
2	29.409	88.0	89.0	73.6	N. W.	...	Ditto.
3	29.399	87.9	88.9	71.5	N. W.	...	Ditto.
4	29.367	89.2	90.5	70.5	N. W.	...	Ditto.
5	29.357	88.5	89.6	70.5	N. W.	...	Ditto.
6	29.363	89.0	90.5	68.5	N. W.	...	Ditto.
7	29.387	90.0	90.0	69.0	N. E.	...	Ditto.
8	29.391	89.9	90.5	70.0	N.	...	Ditto.
9	29.385	87.5	88.0	70.6	N. E.	...	Ditto.
10	29.369	88.6	89.0	68.4	N. W.	...	Ditto.
11	29.309	88.0	89.0	66.4	N. W.	...	— scattered.
12	29.259	85.5	86.9	65.0	N. W.	...	Clear.
13	29.325	85.0	88.0	68.5	S. W.	...	Ditto.
14	29.393	87.2	88.0	66.0	W.	...	Ditto.
15	29.447	86.8	87.5	67.5	N. W.	...	Ditto.
16	29.475	85.5	87.9	66.9	N. W.	...	Ditto.
17	29.459	87.0	88.0	69.9	N. W.	...	Ditto.
18	29.439	86.0	87.4	67.4	N. W.	...	Ditto.
19	29.405	85.0	86.4	67.2	N. W.	...	Ditto.
20	29.345	85.8	86.5	67.6	W.	...	Ditto.
21	29.397	85.0	86.5	65.4	N. W.	...	Ditto.
22	29.417	82.9	83.2	64.5	W.	...	Ditto.
23	29.415	82.9	84.0	60.5	W.	...	Ditto.
24	29.455	81.1	83.0	61.2	W.	...	Ditto.
25	29.481	80.1	81.9	60.9	N. W.	...	Ditto.
26	29.493	81.5	83.1	63.4	N. W.	...	Ditto.
27	29.505	82.9	84.4	66.0	N. W.	...	Ditto.
28	29.527	85.0	86.0	64.4	N. W.	...	Ditto.
29	29.489	83.9	85.5	64.9	N. W.	...	Ditto.
30	29.443	84.5	86.0	65.5	N. W.	...	Ditto.
31	29.505	81.5	83.9	66.6	N. W.	...	Ditto.
Mean.	29.414	85.7	87.0	67.2			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of October, 1856.

Minimum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	29.365	92.5	92.4	75.4	92.6	76.0	84.3	Clear.	N.	..
2	29.355	93.0	93.0	73.5	92.5	72.9	82.7	Ditto.	N. W.	..
3	29.335	93.0	92.5	72.0	92.5	72.5	82.5	Ditto.	N. W.	..
4	29.305	93.9	93.2	71.5	93.5	71.5	82.5	Ditto.	N. W.	..
5	29.315	94.5	93.8	93.8	94.0	70.5	82.25	Ditto.	N. W.	..
6	29.315	94.5	93.3	70.5	94.0	69.9	81.95	Ditto.	N. W.	..
7	29.223	94.5	93.0	72.3	93.0	71.0	82.0	Ditto.	N. E.	..
8	29.355	95.0	94.0	72.0	94.0	75.9	84.95	Ditto.	N.	..
9	29.307	94.0	94.0	71.0	94.0	74.0	84.0	Ditto.	N. E.	..
10	29.283	94.9	96.0	72.0	96.7	69.0	82.85	Ditto.	N. W.	..
11	29.223	90.9	90.0	69.5	90.5	67.0	78.75	\ scattered.	N. W.	..
12	29.205	90.8	89.5	66.8	90.0	66.0	78.0	Clear.	N. W.	..
13	29.287	92.0	91.5	72.9	91.0	67.5	79.25	Ditto.	S. W.	..
14	29.353	91.0	90.0	70.0	91.1	68.5	79.8	Ditto.	N. W.	..
15	29.405	91.0	90.5	70.0	91.0	71.0	81.0	Ditto.	N. W.	..
16	29.425	89.9	89.9	69.4	89.5	67.9	78.7	Ditto.	W.	..
17	29.412	91.0	90.5	71.0	91.0	70.5	80.75	Ditto.	N. W.	..
18	29.381	92.0	91.5	67.9	92.0	69.5	80.75	Ditto.	N. W.	..
19	29.355	90.0	91.5	69.4	91.5	65.5	78.5	Ditto.	N. W.	..
20	29.313	90.0	89.9	68.9	89.5	65.0	77.25	Ditto.	N. W.	..
21	29.373	89.5	89.0	67.5	90.0	65.0	77.5	Ditto.	N. W.	..
22	29.381	87.8	86.9	64.0	88.0	66.0	77.0	Ditto.	N.	..
23	29.397	85.4	85.4	62.4	86.0	61.5	73.75	Ditto.	N.	..
24	29.423	85.5	85.4	61.0	86.1	61.0	73.55	Ditto.	W.	..
25	29.437	85.0	84.4	63.0	85.5	61.0	73.25	Ditto.	N. W.	..
26	29.449	86.4	86.4	63.5	87.0	62.0	74.5	Ditto.	N. W.	..
27	29.461	87.9	87.6	65.0	88.0	62.5	75.25	Ditto.	N. W.	..
28	29.475	88.8	88.5	66.1	90.0	64.8	77.4	Ditto.	N. W.	..
29	29.437	88.9	88.5	65.1	90.0	62.8	76.4	Ditto.	N. W.	..
30	29.407	88.0	87.5	67.4	89.1	61.9	75.5	Ditto.	N. W.	..
31	29.471	85.9	86.0	69.9	86.0	63.9	74.95	Ditto.	N. W.	..
Mean.	29.362	90.5	90.1	69.5	90.6	67.5	79.09			

*Meteorological Register kept at the Office of the Secretary to
Government, N. W. P. Agra, for the month of
November, 1856.*

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.585	80.5	81.9	72.5	N. E.	...	Clear.
2	29.575	81.6	81.5	71.0	S.	...	Ditto.
3	29.569	82.8	84.0	73.0	S.	...	Ditto.
4	29.533	82.0	83.4	71.9	N. W.	...	Ditto.
5	29.529	81.0	82.0	68.6	N. W.	...	Ditto.
6	29.555	77.0	78.5	65.0	W.	...	Ditto.
7	29.573	78.1	79.0	64.9	W.	...	Ditto.
8	29.547	74.5	75.3	60.4	W.	...	Ditto.
9	29.583	72.8	73.4	58.2	N. W.	...	Ditto.
10	29.621	71.0	71.5	56.0	W.	...	Ditto.
11	29.611	70.0	70.5	57.4	W.	...	Ditto.
12	29.585	70.9	73.5	58.4	S.	...	Ditto.
13	29.641	72.9	73.5	60.0	N.	...	Ditto.
14	29.631	73.0	74.0	60.5	S. E.	...	Ditto.
15	29.609	74.0	75.0	61.9	S.	...	Ditto.
16	29.611	73.9	74.8	61.7	S. W.	...	Ditto.
17	29.611	73.9	74.5	62.5	S. W.	...	☼ scattered [hor.
18	29.603	74.9	75.5	62.0	S.	...	Clear.
19	29.555	69.0	70.0	58.0	W.	...	Ditto.
20	29.593	66.2	67.9	54.0	N.	...	Ditto.
21	29.595	65.0	66.5	55.0	N.	...	☼ scattered.
22	29.577	65.0	67.5	53.5	N.	...	Ditto.
23	29.593	66.8	68.4	58.0	N. E.	...	☼ all over.
24	29.609	68.5	69.2	62.5	S. E.	...	Clear.
25	29.647	67.0	68.0	54.5	N. E.	...	Ditto.
26	29.617	65.9	67.0	54.0	N.	...	Ditto.
27	29.567	66.1	68.0	54.5	W.	...	Ditto.
28	29.535	67.0	69.0	56.0	W.	...	Ditto.
29	29.549	68.5	70.5	58.0	W.	...	Ditto.
30	29.535	69.9	71.5	62.0	S.	...	Ditto.
Mean.	29.584	72.3	73.5	60.8			

NOTE.—The dry bulb and Maximum Register do not agree; the former always reads more than the latter. The average difference is 1.6.

*Meteorological Register kept at the Office of the Secretary to
Government, N. W. P. Agra, for the month of
November, 1856.*

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.449	82.5	83.9	71.5	N. E.	...	Clear.
2	29.541	82.9	83.9	71.5	S.	...	Ditto.
3	29.533	84.0	85.0	72.0	S. W.	...	Ditto.
4	29.501	85.0	86.4	71.9	N. W.	...	Ditto.
5	29.505	84.0	85.0	68.6	N. W.	...	Ditto.
6	29.531	81.5	83.5	65.4	W.	...	Ditto.
7	29.541	81.0	83.0	65.5	W.	...	Ditto.
8	29.515	76.4	77.5	61.0	W.	...	Ditto.
9	29.551	74.5	76.6	58.8	N. W.	...	Ditto.
10	29.587	73.0	75.0	56.5	W.	...	Ditto.
11	29.573	74.9	76.0	57.9	W.	...	Ditto.
12	29.575	74.0	76.4	59.5	S.	...	Ditto.
13	29.609	75.3	76.8	60.5	N.	...	Ditto.
14	29.589	76.0	77.0	62.0	S. E.	...	Ditto.
15	29.581	77.8	78.5	62.5	S. W.	...	Ditto.
16	29.593	75.9	76.9	62.5	S. W.	...	Ditto.
17	29.573	77.9	79.0	63.2	S. W.	...	~ scattered.
18	29.571	77.9	79.0	62.5	S.	...	Clear.
19	29.533	74.6	75.9	60.0	N. W.	...	Ditto.
20	29.563	71.0	72.5	54.4	N.	...	Ditto.
21	29.561	68.5	70.5	56.0	N.	...	~ scattered.
22	29.543	69.9	72.0	53.6	N. E.	...	Ditto.
23	29.555	68.5	69.5	59.0	N. E.	...	~ all over.
24	29.571	71.0	72.0	63.4	E.	...	~ scattered.
25	29.617	71.9	72.5	56.5	N. W.	...	Clear.
26	29.563	72.0	72.5	54.5	W.	...	Ditto.
27	29.525	71.9	73.4	55.5	W.	...	Ditto.
28	29.501	71.9	74.9	58.4	W.	...	Ditto.
29	29.529	72.8	74.5	59.0	S. E.	...	Ditto.
30	29.513	73.5	75.0	63.5	S.	...	Ditto.
Mean.	29.549	75.7	77.1	61.5			

*Meteorological Register kept at the Office of the Secretary to
Government, N. W. P. Agra, for the month of
November, 1856.*

Maximum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	29.489	86.2	86.4	71.0	87.0	70.3	78.65	Clear.	N. E.	...
2	29.467	88.9	89.4	72.8	89.5	70.0	79.75	Ditto.	W.	...
3	29.483	87.0	87.0	73.9	87.5	73.0	80.25	Ditto.	W.	...
4	29.433	89.9	89.0	72.1	90.0	71.5	80.75	~ ditto.	E.	...
5	29.469	88.5	87.5	66.5	89.0	70.0	79.5	Ditto.	N. W.	...
6	29.495	87.1	87.4	66.4	87.1	62.0	74.55	Ditto.	W.	...
7	29.489	84.0	85.0	70.5	86.0	65.0	75.5	Ditto.	W.	...
8	29.485	80.1	80.5	63.0	81.0	64.1	72.55	Ditto.	W.	...
9	29.505	77.5	78.0	60.0	79.0	62.0	70.5	Ditto.	N. W.	...
10	29.545	80.0	80.0	58.5	80.0	57.8	68.9	Ditto.	W.	...
11	29.527	80.2	80.4	59.4	81.0	57.0	69.0	Ditto.	N. W.	...
12	29.547	79.9	79.9	62.4	81.9	56.9	69.4	Ditto.	N. W.	...
13	29.553	78.9	78.5	61.0	79.5	59.5	69.5	Ditto.	N.	...
14	29.535	79.8	79.4	64.4	80.2	61.9	71.05	Ditto.	S. E.	...
15	29.531	80.8	80.4	63.5	81.1	61.0	71.05	Ditto.	S. W.	...
16	29.513	81.9	81.5	64.5	83.0	62.0	72.5	~ scattered.	S. W.	...
17	29.513	81.9	81.0	65.5	83.1	62.0	72.55	Ditto.	S. W.	...
18	29.515	81.9	81.9	64.0	82.5	61.0	71.75	Ditto.	W.	...
19	29.503	80.9	81.0	59.5	82.5	57.8	70.15	Ditto.	N. W.	...
20	28.505	76.0	75.9	57.0	76.5	51.5	64.0	Ditto.	N.	...
21	29.511	74.9	75.0	56.5	76.0	47.9	61.95	Ditto.	N.	...
22	29.571	73.0	73.0	54.4	74.5	49.0	61.75	Ditto.	N. E.	...
23	29.465	70.0	71.0	61.0	71.1	52.8	61.95	~ all over.	N. E.	...
24	29.529	74.0	74.0	62.5	74.0	58.9	66.45	~ scattered.	E.	...
25	29.567	76.5	75.5	59.0	78.0	55.5	66.75	Clear.	N. W.	...
26	29.525	75.5	75.1	55.6	76.0	50.0	63.0	Ditto.	W.	...
27	29.479	76.9	76.5	58.5	78.0	50.0	64.0	Ditto.	W.	...
28	29.465	79.0	78.9	58.4	81.0	53.5	67.25	Ditto.	W.	...
29	29.487	79.9	80.0	60.5	80.5	52.5	66.5	Ditto.	S. W.	...
30	29.483	79.0	79.0	65.0	79.5	55.5	67.5	Ditto.	S.	...
Mean.	29.506	80.3	80.2	63.0	81.2	59.4	70.29			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of December, 1856.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.599	69.5	71.8	61.0	S.	..	Clear.
2	29.585	69.5	71.0	61.0	S.	..	Ditto. [S. E.
3	29.561	68.9	70.4	62.0	S. E.	..	~ scattered towards
4	29.655	65.0	65.5	59.5	N. E.	..	Clear.
5	29.673	64.4	65.5	56.3	N.	..	Ditto.
6	29.691	63.8	65.5	54.0	N.	..	Ditto.
7	29.661	63.0	64.8	52.0	N. W.	..	Ditto.
8	29.673	58.9	60.0	49.0	W.	..	Ditto.
9	29.695	60.9	62.4	51.0	S. W.	..	Ditto.
10	29.695	58.9	61.0	50.6	W.	..	Ditto.
11	29.667	59.8	61.5	53.2	N.	..	Ditto.
12	29.633	61.0	62.9	51.9	N.	..	Ditto.
13	29.665	62.9	64.0	54.5	N. E.	..	Ditto.
14	29.639	63.0	64.5	54.5	N. E.	..	~ all over.
15	29.611	61.0	62.4	53.5	N. E.	..	Clear.
16	29.597	59.0	60.4	53.0	N. E.	..	Ditto.
17	29.605	58.9	60.5	53.9	N. W.	..	Ditto.
18	29.557	59.0	61.0	51.0	N. W.	..	Ditto.
19	29.587	60.2	62.0	52.5	N. E.	..	Ditto.
20	29.643	59.0	60.0	52.5	W.	..	Ditto.
21	29.605	60.0	61.4	49.5	W.	..	Ditto.
22	29.693	58.0	60.0	49.0	N.	..	Ditto.
23	29.617	56.0	57.5	48.0	N.	..	Ditto.
24	29.657	58.0	60.1	47.5	W.	..	Ditto.
25	29.595	60.0	62.2	52.8	N. E.	..	Ditto.
26	29.635	58.8	60.5	50.0	N. E.	..	Ditto.
27	29.711	55.9	57.8	51.0	N. E.	..	Ditto.
28	29.545	60.2	61.7	56.6	N. E.	..	Ditto.
29	29.529	59.2	61.0	52.0	N. E.	..	Ditto.
30	29.527	62.0	64.6	53.9	N. E.	..	~ scattered.
31	29.489	63.8	66.4	55.5	E.	..	
Mean.	29.625	61.2	62.2	53.3			

NOTE.—The dry bulb and maximum Register do not agree; the former always reads more than the latter. The average difference is 1.6.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of December, 1856.

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Direction of Wind.	Quantity of Rain.	Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.			
1	29.565	74.2	76.4	61.0	S. E.	...	Clear.
2	29.547	74.2	75.0	60.5	S. E.	...	Ditto.
3	29.529	72.1	73.4	62.5	S. E.	...	~ scattered towds. S. E.
4	29.597	69.5	71.5	61.0	N. E.	...	Clear.
5	29.423	69.3	70.2	57.8	N.	...	Ditto.
6	29.649	69.0	69.0	54.5	N. W.	...	Ditto.
7	29.641	69.0	70.0	52.0	N. W.	...	Ditto.
8	29.655	64.2	66.9	51.5	W.	...	Ditto.
9	29.665	65.2	67.9	52.5	W.	...	Ditto.
10	29.669	65.0	67.9	53.9	W.	...	Ditto.
11	29.631	64.9	67.5	54.0	N.	...	Ditto.
12	29.597	65.9	68.0	54.0	N.	...	Ditto.
13	29.629	67.1	69.0	55.0	N. E.	...	Ditto.
14	29.591	68.0	69.0	55.0	N. E.	...	~ all over.
15	29.571	65.0	66.5	55.0	N. E.	...	Clear.
16	29.547	64.0	65.9	54.0	N. E.	...	Ditto.
17	29.571	63.9	65.5	55.5	N.	...	Ditto.
18	29.533	65.0	66.9	54.9	N. W.	...	Ditto.
19	29.551	67.0	68.5	53.5	N. W.	...	Ditto.
20	29.627	67.5	68.9	53.5	W.	...	Ditto.
21	29.579	66.9	67.9	61.0	W.	...	Ditto.
22	29.661	63.2	65.5	51.5	N.	...	Ditto.
23	29.687	64.0	66.4	50.4	N. W.	...	Ditto.
24	29.611	63.0	65.1	50.4	W.	...	Ditto.
25	29.573	64.2	65.6	53.5	N. E.	...	Ditto.
26	29.621	61.0	63.0	51.0	N. E.	...	Ditto.
27	29.671	61.2	63.8	53.0	N. E.	...	Ditto.
28	29.509	65.0	66.4	58.5	N. E.	...	Ditto.
29	29.489	64.8	67.4	54.0	N. E.	...	Ditto.
30	29.489	68.5	71.5	56.5	E.	...	Ditto.
31	29.441	70.0	72.6	57.5	S. E.	...	Ditto.
Mean.	29.584	66.5	68.3	55.0			

Meteorological Register kept at the Office of the Secretary to Government, N. W. P., Agra, for the month of December, 1856.

Minimum pressure observed at 4 p. m.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Direction of Wind.	Quantity of Rain.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.			
1	29.507	77.5	77.0	62.0	78.0	53.5	65.75	Clear.	S. E.	..
2	29.493	76.9	75.9	61.5	77.1	53.8	65.45	Ditto.	S. E.	..
3	29.481	71.2	69.5	59.5	75.5	54.8	65.15	~ scattered.	S. E.	..
4	29.567	74.5	73.5	62.5	74.5	54.0	64.25	Clear.	N. E.	..
5	29.591	73.2	72.2	58.8	73.5	50.0	61.75	Ditto.	N. W.	..
6	29.605	71.9	70.9	54.5	75.0	47.0	61.0	Ditto.	N. W.	..
7	29.621	73.0	73.2	54.0	74.5	45.5	60.0	Ditto.	N. W.	..
8	29.619	70.9	71.0	54.0	72.0	42.8	57.4	Ditto.	W.	..
9	29.623	70.5	70.5	55.0	72.0	44.9	58.45	Ditto.	W.	..
10	29.617	72.0	71.9	55.4	73.5	43.0	58.25	Ditto.	W.	..
11	29.571	72.5	72.0	56.2	73.5	44.9	59.2	Ditto.	N.	..
12	29.555	72.5	72.5	57.2	73.0	45.8	59.4	Ditto.	N. E.	..
13	29.591	71.0	70.5	58.5	72.0	49.9	60.95		N. E.	..
14	29.549	70.9	70.4	56.9	71.1	50.0	60.55			..
15	29.511	69.0	69.0	55.9	69.5	49.0	59.25			..
16	29.509	69.0	69.0	55.8	70.5	47.0	58.75			..
17	29.513	69.5	69.5	57.1	70.0	46.8	58.4	Clear. [over.	N. W.	..
18	29.501	72.5	72.0	55.1	73.8	44.5	59.15	~ scattered all	N. W.	..
19	29.511	73.5	73.0	55.5	75.0	44.8	59.9	Clear.	N. W.	..
20	29.589	73.0	72.1	55.0	76.0	45.8	60.9	Ditto.	W.	..
21	29.527	70.0	70.0	53.0	72.5	45.0	58.95	Ditto.	W.	..
22	29.633	70.0	69.4	52.5	71.0	44.0	57.5	Ditto.	N.	..
23	29.637	70.9	70.4	52.5	72.1	41.0	56.55	Ditto.	N. W.	..
24	29.579	69.0	69.0	53.0	70.4	41.8	56.1	Ditto.	W.	..
25	29.645	68.5	68.5	55.0	69.2	42.0	55.6	Ditto.	N. E.	..
26	29.591	67.0	67.0	53.8	67.5	42.0	54.75	Ditto.	N. E.	..
27	29.617	68.6	68.6	54.4	69.0	43.2	56.1	Ditto.	N. E.	..
28	29.469	69.0	69.0	60.0	70.5	43.0	56.75	Ditto.	N. E.	..
29	29.441	70.0	70.0	56.0	71.2	49.0	60.1	Ditto.	N. E.	..
30	29.449	74.0	74.0	58.4	74.1	50.5	62.3	Ditto.	E.	..
31	29.397	74.5	74.5	58.5	75.0	49.0	62.0	~ scattered.	E.	..
Mean.	29.552	71.4	71.1	56.3	72.6	46.7	59.69			

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